Cessna-Crafted
ELECTRONICS

SERIES

800

TRANSCEIVER

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SERVICE/PARTS MANUAL

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TRANSCEIVER

SERVICE/PARTS MANUAL

THE CESSNA CRAFTED TRANSCEIVER 800 SERVICE/PARTS MANUAL CONTAINS THE FOLLOWING INFORMATION, WHICH CAN BE FOUND IN THE BACK OF THE MANUAL, IN ADDITION TO THAT FOUND IN THE CONTENTS:

1. INSTRUCTIONS FOR CESSNA TRANSCEIVER 800 DYNAVERTER
2. PARTS CATALOG FOR CESSNA TRANSCEIVER 800 COMPONENTS
3. DIFFERENCE DATA FOR CESSNA TRANSCEIVER 800 (Part Number 27610-0028)

D-245-13-ARC/ICKES-500-7/64

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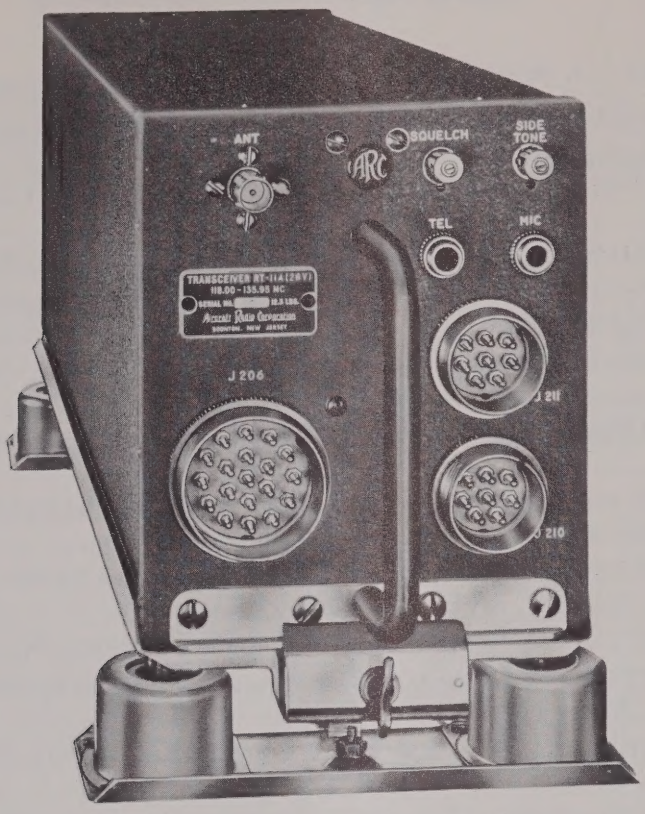
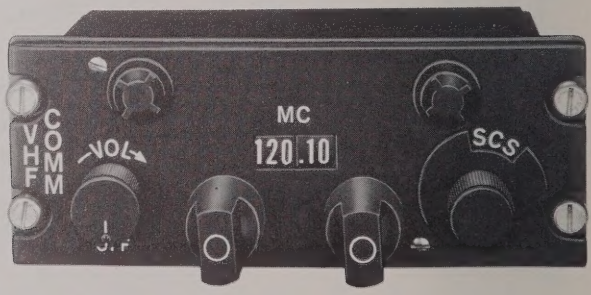
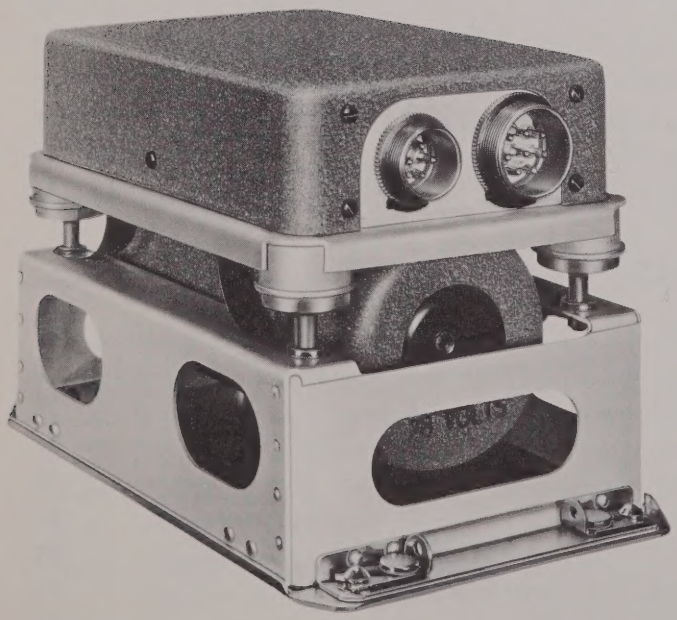


ARC TYPE RT-11A RECEIVER-TRANSMITTER
WITH
ARC TYPE M-31A MOUNTING



ARC TYPE C-67A CONTROL UNIT



ARC TYPE P-15A POWER UNIT
WITH
ARC TYPE M-32A MOUNTING

Figure 1-1. ARC Type 210 VHF Communication Equipment, Major Units

TP1112

SECTION I
GENERAL INFORMATION

1–1. PURPOSE.

The ARC Type 210 VHF Communication Equipment is an airborne, 360-channel, voice amplitude-modulated, transmitting-receiving system. The equipment is electrically tuned and crystal controlled, and covers the frequency range of 118.00 to 135.95 mc in 50-kc steps to provide a total of 360 channels. Two modes of operation are available: single-channel simplex (SCS), during which the transmitter and receiver operate on the same frequency, and double-channel simplex (DCS)[1], during which the transmitter operates 6.0 mc above the receiver frequency.

1–2. SPECIFICATIONS.

General Characteristics.

FREQUENCY:	118.00 to 135.95 mc
NUMBER OF CHANNELS:	360
CHANNEL SPACING:	50 kc (0.05 mc)
CHANNELING TIME:	4 seconds, maximum
MODES OF OPERATION:	SCS (single-channel simplex) DCS (double-channel simplex)[1]
INPUT POWER:	Receive: 8.8 amperes at 14 volts dc or 4.5 amperes at 28 volts dc Transmit: 13.2 amperes at 14 volts dc or 6.5 amperes at 28 volts dc
TOTAL WEIGHT:	22 pounds
ENVIRONMENTAL LIMIT:	Meets CAA TSO C-37 and TSO C-38, and MIL Specification MIL-T-5422 for temperature, humidity, vibration, shock, and altitude (30,000 feet)

RT-11A Receiver-Transmitter.

TRANSMITTER SECTION:

Power Output: 12-18 watts

Output Impedance: 50 ohms, nominal

Modulation: High level. High percentage without over-modulation, controlled by limiting circuit

Tuning: Automatic, crystal controlled. Eighteen crystals on transmitter megacycle drum; fundamental frequency range 54.00-62.50 mc in 0.5-mc steps. Twenty crystals on fractional megacycle drum (shared with receiver); frequency range 10.00-10.95 mc

Frequency Stability: ±0.005%

Spurious Emission: Less than 50 microwatts

Sidetone: Adjustable to 50 milliwatts

Tube Complement:

6021	Megacycle crystal oscillator and doubler
6021	Fractional megacycle crystal oscillator and balanced mixer
5718	Fractional megacycle cathode follower
5840	R-f amplifier
5686	R-f driver amplifier
6850	Push-pull power amplifier
6021	Microphone amplifier, a-f amplifier
6021	A-f amplifier, phase splitter
6850	Push-pull modulator
0B2	Modulator screen voltage regulator

RECEIVER SECTION:

Circuit: 11-tube superheterodyne, double conversion

Input Impedance: 50 ohms nominal

Sensitivity: 6 db S+N/N with less than 2 microvolts, 30% modulation, 1000 cps, for 150 milliwatts a-f output

Bandwidth: 28 kc, 6 db down; 70 kc, 60 db down

Tuning: Automatic, crystal controlled. Eighteen crystals on receiver megacycle drum; fundamental frequency range 53.15-61.65 mc in 0.5-mc steps. Twenty crystals on fractional megacycle drum (shared with transmitter); frequency range 10.00-10.95 mc

Intermediate Frequencies:
First i-f (variable) 11.70-12.65 mc
Second i-f (fixed) 1.70 mc

I-f Rejection: At least 100 db

Image Rejection: At least 66 db

Other Spurious Rejection: At least 80 db

AGC: Within 4.5 db, 10-20,000 microvolts

Audio Output Capability: 1 watt (300-ohm load)

Total Harmonic Distortion: Less than 25% with 20,000 microvolts, 85% modulation, 1000 cps

[1] DCS operation is incorporated to accommodate those frequencies which may be assigned to this mode of operation.

Audio Frequency Response: 4 db, 400-3000 cps

Squelch: Adjustable, 0 to 25 microvolts

Noise Limiter: Series type, silicon diode (1N462)

Tube Complement:

5718, 5718	Cascode r-f amplifier
6021	Megacycle crystal oscillator and doubler
5899	First mixer
5899	Second mixer
5899	First 1.7-mc amplifier
5899	Second 1.7-mc amplifier
5899	Third 1.7-mc amplifier
5896	Detector-AGC
6112	Squelch amplifier, first audio amplifier
5902	A-f power amplifier

MOUNTING REQUIRED: ARC Type M-31A

WEIGHT: 12.2 pounds, less mounting
13.8 pounds, including mounting

DIMENSIONS: 6 1/16 in. wide, 7 1/2 in. high, 17 3/4 in. long overall, including mounting

C-67A Control Unit.

WEIGHT: 1.3 pounds

DIMENSIONS: 5 3/4 in. wide, 2 1/4 in. high, 3 7/8 in. deep overall, 2 1/2 in. deep behind front panel

P-15A Power Unit.*

DYNAMOTOR RATINGS: Receive condition (output windings bucking):
Input–13.5 volts dc, 4.5 amperes or 27.0 volts dc, 2.1 amperes
Output–240 volts dc, 65 milliamperes and 120 volts dc, 50 milliamperes

Transmit condition:
Input–13.5 volts dc, 9.5 amperes or 27.0 volts dc, 4.3 amperes
Output–340 volts dc, 200 milliamperes and 115 volts dc, 48 milliamperes

MOUNTING REQUIRED: ARC Type M-32A

WEIGHT: 6.5 pounds, less mounting
6.8 pounds, including mounting

DIMENSIONS: 5 7/16 in. wide, 5 7/16 in. high, 8 1/32 in. long overall, including mounting

1–3. UNITS SUPPLIED.

The units and accessories which comprise the Type 210 are listed in Table 1–1. The major units are shown in Figure 1–1.

* For DV-15A specifications, refer to supplement.

TABLE 1–1. UNITS SUPPLIED

Qty	Name	ARC Part No.
	MAJOR UNITS	
1	Receiver-Transmitter ARC Type RT-11A[1]	19300
1	Control Unit ARC Type C-67A[2,3]	20350
1	Power Unit ARC Type P-15A[1,5]	20650
1	Dynaverter ARC Type DV-15A[1,4]	22560
1	Mounting ARC Type M-31A	20660
1	Mounting ARC Type M-32A	21455
	ACCESSORIES	
1	Set of Connectors, consisting of:	FES-1282
1	Connector, plug	14052
2	Connector, plug	15912
2	Connector, plug	16115
1	Connector, plug	16210
2	Connector, coaxial (UG-88C/U)	11337
AR	Cable, coaxial (RG-58/U)	11318(*)[5]
1	Instruction Book	—

[1] The RT-11A, P-15A, and DV-15A are supplied in either a 14-volt or a 28-volt model.
[2] The C-67A is furnished with 28-volt pilot lamps installed and with 14-volt lamps as accessories.
[3] For custom control panel parts in place of the C-67A, refer to par. 1–5.
[4] Either the P-15A or DV-15A is supplied.
[5] In place of asterisk, cable length in feet and inches is specified to complete part number.

1–4. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

Interconnecting cable assemblies are not supplied but are fabricated from individual wires (not supplied), and the coaxial cable and set of connectors listed in Table 1–1. The wire sizes and connectors required to fabricate the interconnecting cables are shown in Figures 2–11 and 2–12. The actual length of the cables will depend on the location of the equipment in the aircraft. The Type 210 requires a primary power source capable of supplying 13.2 amperes at 14 volts dc or 6.5 amperes at 28 volts dc, depending on the voltage rating of the equipment. The following ARC items, or their equivalents, are also required for operation of the Type 210:

Qty	Name	ARC Part No.
1	Antenna ARC Type A-15 or	16630
	Antenna ARC Type A-25A	25060
1	Microphone, carbon	11937
1	Headset, 600 ohms	11935

1–5. PARTS FOR CUSTOM CONTROL PANEL.

If a custom control panel is used in place of the C-67A Control Unit, the following parts are required (for installation, refer to paragraph 2–2):

Qty	Name	ARC Part No.
1	Channel Selector Switch Assembly[1]	20730
1	Volume Control and Switch Assembly	8862
1	Knob Assembly	16331
1	Lockwasher	8540
1	Nut	4697
1	Switch, Rotary (SCS-DCS)[2]	20332
1	Knob Assembly	20399
1	Lockwasher	8661

[1] Control knobs, mask, spacer plates, and mounting hardware are supplied with the selector switch.
[2] A mounting nut is supplied with the rotary switch.

1–6. DESCRIPTION.

Receiver-Transmitter. The ARC Type RT-11A Receiver-Transmitter is a miniaturized receiver-transmitter consisting of three major plug-in assemblies: a transmitter, receiver, and modulator. Each major assembly is held in place on the main chassis by means of captive screws. The main chassis is made of drawn and formed aluminum sections which are bolted together to form a strong, lightweight framework. All connections, parts, and wiring common to the three major assemblies are located on the main chassis.

Both the transmitter and receiver utilize crystal-saving circuits so that only 56 crystals are required for 360 channels. The crystals are divided into three groups; each group is mounted on a separate crystal drum. Since the transmitter and receiver always operate on the same fraction of a megacycle, a single oscillator is used to supply the mixing frequency. The mixing frequency is controlled by any one of 20 crystals located on the drum called the "fractional megacycle crystal drum." For SCS-DCS operation, separate drums, called "megacycle crystal drums," which contain 18 crystals each, are used in the transmitter and receiver. The fractional megacycle crystals cover the frequency range of 10.00-10.95 mc in 0.05-mc steps. The transmitter and receiver megacycle crystals cover the ranges 54.00-62.50 mc and 53.15-61.65 mc, respectively, in 0.5-mc steps.

The transmitter assembly uses six tubes, four of which are subminiature types soldered directly into the circuit; the other two are plug-in types. The transmitter circuit consists of an oscillator-doubler for generating megacycle frequencies from 108-125 mc, an oscillator-balanced mixer for addition of the fractional megacycle frequencies 10.00-10.95 mc, two stages of r-f amplification for the resultant transmitting frequency range of 118.00 mc through 135.95 mc, and a push-pull power amplifier output. Megacycle tuning of the transmitter stages is accomplished by a set of variable capacitors driven by a cam on the megacycle crystal drum shaft. Fractional megacycle tuning is accomplished by inductive trimmers driven by a cam on the fractional megacycle crystal drum shaft. A cathode follower, fed by the fractional megacycle oscillator, supplies fractional megacycle frequencies to the second i-f mixer in the receiver.

The modulator assembly uses two subminiature and two plug-in tubes. The modulator consists of a two-stage microphone amplifier, a diode limiter, an audio amplifier-phase splitter, a push-pull modulator tube, and a screen voltage regulator. Both plates and screens of the r-f power amplifier are modulated.

The receiver assembly employs eleven subminiature tubes in a double-conversion superheterodyne circuit as follows: a two-stage, series d-c coupled cascode amplifier, a megacycle crystal oscillator-doubler (106.3-123.3 mc), a first mixer, a variable first i-f filter, (11.70-12.65 mc), a second mixer, three 1.7-mc amplifiers, a detector-agc, a squelch amplifier-first a-f amplifier, and an a-f power amplifier. The first i-f filter is variable from 11.70-12.65 mc and includes a double-tuned circuit tuned by slugs driven by a cam geared to the fractional megacycle crystal drum. The second mixer derives its injection voltage from the fractional megacycle oscillator in the transmitter.

Drive mechanisms for remote control tuning are part of the receiver and transmitter assemblies. Tuning to any one of the 360 channels is accomplished by a single motor which drives any or all three crystal drums. The crystal drums are pawl-and-ratchet rotated by means of cams on the motor drive shaft. When a new channel is selected, the appropriate latching relays close the motor circuit and release the pawls against the cams. The cams drive the crystal drums until the desired channel position is reached, at which point the latching relay opens and locks the pawl in home position. The motor runs until all the pawls are locked.

Printed circuits and miniaturized components are used in each of the three major assemblies. The fixed capacitors used in the r-f circuits are temperature-compensated to insure frequency stability. The slug-tuned transformers used in the first i-f filter are of cup-core construction, using relatively high-permeability iron. The coils and cores are vacuum-impregnated with resins for moisture protection. The 1.7-mc i-f amplifiers use a total of four double-tuned transformers, which are pretuned, filled with nitrogen, and hermetically sealed. Special alloy tube clamps are used on the subminiature tubes to conduct the bulb heat of each tube to the chassis.

The 28-volt model of the RT-11A operates from a primary power source of 6.5 amperes at 27.5 volts dc. The 14-volt model requires 13.2 amperes at 13.75 volts dc. The high-voltage d-c potentials are supplied by the P-15A Power Unit. All electrical connections for the RT-11A are made through receptacles located on the front panel. A dust cover encloses the RT-11A and is secured to the chassis by two captive screws on the rear of the cover. Three small rectangular windows are provided on the sides of the dust cover so that the frequency setting of each of the three crystal drums can be checked without removing the cover. The RT-11A requires an ARC Type M-31A Mounting for installation.

Control Unit. The ARC Type C-67A Control Unit is an edge-lighted plastic panel, console-type control assembly for the Type 210. It includes a megacycle channel selector switch, a fractional megacycle channel selector switch, a mode-of-operation switch (SCS-DCS), and a volume control combined with a rotary on-off switch

(VOL-OFF). The channel frequency desired is selected by remote control using three 5-wire, open-seeking, binary re-entrant circuits. The megacycle frequency selector switch is a geared, 18-position, printed-circuit, revolving drum assembly which controls the positioning of both the receiver and transmitter megacycle crystal drums. The fractional megacycle frequency selector switch is a 20-position, revolving drum assembly which controls the positioning of the fractional megacycle crystal drum. Each drum dial is marked to indicate its respective frequency setting. The combined reading (megacycle plus fractional megacycle frequency) indicates the selected frequency.

A five-pole, double-throw rotary switch is used for the mode-of-operation (SCS-DCS) switch. In the SCS position, the switch connects five leads to one of two sets of wipers on the megacycle channel selector switch, which controls the positioning of the transmitter megacycle crystal drum. In this position, the transmitter operates on the same frequency as the receiver. When rotated to the DCS position, the switch connects the five leads to the second set of wipers on the megacycle channel selector switch. The transmitter megacycle crystal drum is now indexed to a transmitting frequency 6.0 mc above the receiving frequency; however, the channel frequency dial (MC) always indicates the receiving frequency. The volume control is connected across the output of the first audio amplifier in the receiver and controls the level of the receiver a-f output.

Primary power is controlled by an on-off rotary switch combined with the volume control. Edge-lighting illumination of the controls and panel designations is provided by two midget flange-base lamps installed in red-filter light assemblies located on the plastic panel. Power to these lamps is controlled by the aircraft's panel light control. All electrical connections to the C-67A are made through a receptacle located on the rear panel. The unit is secured to the console by means of four Dzus fasteners on the front panel. The dust cover is fastened to the unit by two Dzus fasteners located on the rear panel.

Note

The controls of the C-67A may be supplied separately for a custom control panel installation. For a list of these parts, refer to paragraph 1–5.

Power Unit. The ARC Type P-15A Power Unit is a double-commutator dynamotor designed to operate from the aircraft's d-c supply and furnish −120-volt and +340-volt dc outputs. The P-15A supplies all the bias and high-voltage requirements of the RT-11A Receiver-Transmitter. Under both transmit and receive conditions, the positive terminal of the 120-volt supply is permanently grounded. The negative terminal is connected to supply plate power for the fractional megacycle crystal oscillator and receiver a-f power amplifier, and grid bias for the modulator output stage. Under receive conditions, the negative terminals of the two supplies are connected together and the positive terminal of the 340-volt supply is connected to the receiver B+ input, thus providing the receiver with a plate power source of 220 volts. During transmit conditions, the negative terminal of the 340-volt supply is grounded and the positive terminal is connected to the transmitter plate circuits, thus providing 340 volts to the transmitter power amplifier and modulator output stage.

The P-15A Power Unit consists of a filter assembly, a dynamotor, and an aluminum frame assembly. The filter assembly and dynamotor are mounted on opposite sides of a plate which is shock mounted on the frame assembly. Flexible metal straps are attached to the shock mounts to ground the P-15A. The filter assembly contains all components required for filtering the high-voltage and bias supplies. The P-15A requires an ARC Type M-32A Mounting for installation. All electrical connections are made through two receptacle connectors located on the front of the P-15A.

Dynaverter.

Note

Information for the ARC Type DV-15A Dynaverter is contained in the supplement to this instruction book.

Mountings. The ARC Type M-31A Mounting is used to shock-mount the RT-11A Receiver-Transmitter. The RT-11A is secured by a fixed flange at the rear and an adjustable flange at the front of the mounting. Two flexible metal straps located on the underside of the mounting are used to ground the RT-11A and the M-31A to the airframe. Sixteen No. 10 screw holes are provided in the M-31A for securing the mounting.

The ARC Type M-32A Mounting is an aluminum plate used to mount the P-15A Power Unit. The P-15A is secured to the M-32A by engaging the two snapslides on the frame assembly of the P-15A with the grooved studs of the M-32A. Four No. 10 screw holes are provided in the M-32A for securing the mounting.

Accessories. The accessories for the Type 210 consist of a set of connectors required to fabricate the unit interconnecting cables and a length of RG-58/U coaxial cable used for the antenna lead-in. Two UG-88C/U coaxial connectors are included in the set of connectors for terminating the RG-58/U cable.

SECTION II

INSTALLATION

Note

Modifications of the RT-11A Receiver-Transmitter are identified by an "M" number stamped on the bottom of the main chassis. The information contained in this section is applicable to all models, unless noted otherwise.

2–1. CABLE FABRICATION.

Except for the fabrication of the interconnecting cable assemblies, no special procedures are required before installation to prepare the ARC Type 210 VHF Communication Equipment for use. The connectors required for the cables are supplied, but the individual wires are not. Open-wire cables are recommended because of their flexibility, ease of construction, and facility of repair. System interconnecting diagrams are shown in Figures 2–11 and 2–12. The final length of the cable assemblies will depend on the location of the equipment in the aircraft. Instructions for fabricating the antenna cable assembly are given in Figure 2–13.

2–2. INSTALLATION.

Installation Considerations. The location and installation of the Type 210 will depend on the type of aircraft in which the equipment is to be installed; however, the following general requirements, applicable to all types of aircraft, should be considered when planning the installation.

Available installation area and unit dimensions. Refer to the outline dimension drawings, Figures 2–1 through 2–5. (Mounting dimensions for custom control parts are shown in Figures 2–6 and 2–7.) Compare the space requirements for each unit with the area being considered. Locate the units so that they are accessible for inspection and maintenance, and in an area that is free from excessive vibration and heat.

Location of the units. The RT-11A Receiver-Transmitter may be installed in any convenient location, with consideration given to the relative distance from associated units to keep the interconnecting cables (especially the antenna cable) to minimum lengths. The C-67A Control Unit is console-mounted and should be installed within convenient view and reach of the operator. The P-15A Power Unit may be installed in any convenient location. Allow sufficient clearance on all sides of the RT-11A and the P-15A for shock-mount travel and ventilation, and sufficient space around these units to permit easy removal from their mountings. Leave enough space to make cable connections. Cables should be arranged so that shock-mount travel is not restricted. No sharp bends should be made in any of the cables. Cables should not be run where they may be subjected to excessively high temperatures, such as may exist adjacent to heaters or engine exhausts.

Installation of RT-11A and M-31A. Installation dimensions for the RT-11A Receiver-Transmitter installed on the M-31A Mounting are shown in Figure 2–1. Installation dimensions for the M-31A alone are shown in Figure 2–2. To install the M-31A and the RT-11A, proceed as follows:

Step 1. Drill the aircraft mounting surface for eight No. 10 screws, located as shown in Figure 2–2. The mounting surface should be clean, bare metal to insure proper grounding of the unit.

Step 2. Secure the M-31A to the mounting surface.

Step 3. Loosen the thumbscrew on the front of the M-31A and slide the adjustable mounting flange to its forward position. Slide the RT-11A on the M-31A so that it engages the fixed flange at the rear of the mounting. Position the adjustable mounting flange so that it firmly engages the RT-11A front panel bracket. Secure the RT-11A on the M-31A by tightening the thumbscrew.

Installation of C-67A. Installation dimensions for the C-67A Control Unit are shown in Figure 2–3. The C-67A is designed for installation on a standard AN. console panel. It is secured to the console by means of four Dzus fasteners. (Mounting dimensions for custom control parts, which duplicate the function of the C-67A, are shown in Figures 2–6 and 2–7.)

The C-67A is furnished with two type 327 (28-volt) midget flange-base panel lamps installed and two type 330 (14-volt) lamps as accessories. To install or replace these lamps, refer to lamp replacement instructions given in paragraph 5–3.

Installation of P-15A. Installation dimensions for the P-15A Power Unit with M-32A Mounting are shown in Figure 2–4. Mounting dimensions for the M-32A alone are shown in Figure 2–5. To install the M-32A and the P-15A, proceed as follows:

Step 1. Drill the aircraft mounting surface for four No. 10 screws, located as shown in Figure 2–5. The mounting surface should be clean, bare metal to insure adequate grounding of the unit.

Step 2. Secure the M-32A to the mounting surface.

Step 3. Install the P-15A on the mounting and secure by closing the two snapslides located on the P-15A.

Installation of Custom Control Parts. If custom control parts are used in place of the C-67A Control Unit, installation information is given in Figures 2–6 through 2–10. Mounting dimensions and assembly details for the volume control and switch assembly (VOL-OFF), mode-of-operation switch (SCS-DCS), and channel selector switch (MC) are shown in Figure 2–6. The method of mounting the channel selector switch (MC) will vary, depending on the thickness of the metal mounting plate and whether a 3/16-inch edge-lighted plastic panel is used in front of the metal panel. Assembly details for the channel selector switch (MC) and hole layout details for the 3/16-inch plastic panel are shown in Figure 2–7. Wiring information for the custom control panel parts is given in Figures 2–8, 2–9, and 2–10.

2–3. OPTIONAL REMOTE SQUELCH CONTROL.

If maximum sensitivity for long-distance communication is desired, a remote squelch control may be installed. With this control, the operator may adjust the squelch threshold for maximum sensitivity when flying over open country or decreased sensitivity when flying low over noisy areas such as large cities and industrial sites.

The remote squelch control should be connected as shown in Figure 2–11 or 2–12. For RT-11A units stamped M-1 through M-7, use a 500,000-ohm linear taper potentiometer. For RT-11A units stamped M-8 or higher, a 100,000-ohm to 500,000-ohm linear taper potentiometer may be used, with 100,000 ohms being the preferred value. The control should be located in a position accessible to the pilot. It will provide a remote control squelch threshold range of approximately 0 to 15 microvolts.

2–4. PREINSTALLATION ADJUSTMENT.

Normal RT-11A Squelch Adjustment. Before installing the equipment in the aircraft, adjust the SQUELCH potentiometer located on the front panel of the RT-11A as follows:

Step 1. Connect the units of the ARC Type 210, on a bench, for normal system operation. (See Figure 2–11 or 2–12.)

Step 2. Turn power on and adjust low-voltage supply for 13.75 or 27.5 volts dc, as applicable. Allow equipment to warm up for about 5 minutes.

Step 3. Connect a vhf signal generator, such as Boonton Radio Type 211-A with Boonton Radio Type 505-B 6-db pad and Adapter UG-349A/U, to the ANT connector on the RT-11A.

Step 4. Loosen the locknut on the RT-11A SQUELCH control and set the control to the maximum counterclockwise position.

Step 5. Set the C-67A megacycle and fractional megacycle channel selector switches to 135.50 mc, and tune the modulated signal generator accordingly until audio output is heard in the headset or speaker.

Step 6. Adjust the SQUELCH control in a clockwise direction until it requires from 3 to 5 microvolts output from the signal generator to just break the squelch threshold.

Note

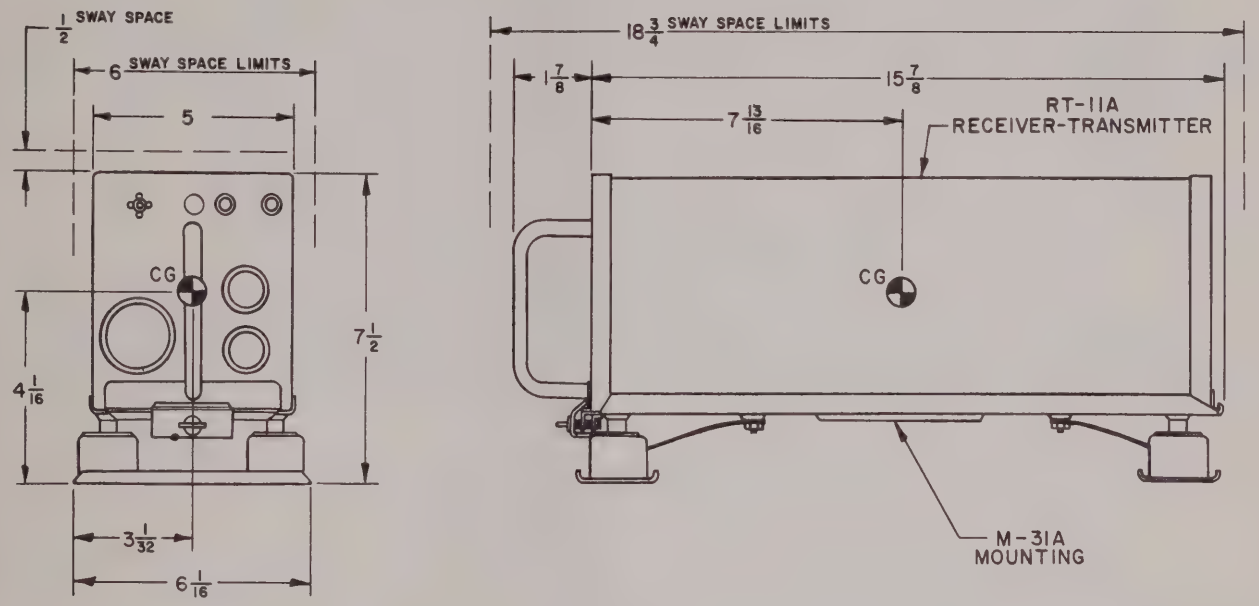
This level of adjustment has been established as a setting for average conditions encountered in aircraft use and will provide reliable communication. For conditions where noise sources in the aircraft are excessive, or for constant use over noisy industrial areas, a slightly higher setting of squelch threshold may be necessary.

Step 7. After adjustment of the SQUELCH control, tighten the locknut, being careful not to disturb the setting of the control.

Remote Squelch Control Adjustment. If a remote squelch control is installed (paragraph 2–3), adjust and lock the RT-11A SQUELCH control on the front panel in its maximum clockwise position (maximum squelch). The squelch threshold level may then be controlled as desired by the remote squelch control.

2–5. CHECKS AND ADJUSTMENT AFTER INSTALLATION.

The tuning of the RT-11A Receiver-Transmitter is fully automatic and no tuning adjustments are required prior to placing it in operation. However, a ground check of RT-11A transmission and reception on several channel frequencies for both SCS and DCS operation should be made with the aircraft engines running and with all electrical equipment operating normally. During these tests, the SIDETONE locking-type potentiometer located on the front panel of the RT-11A should be adjusted as follows: Loosen the locknut. With the RT-11A operating in the transmit condition, and with all normal audio loads connected, adjust the SIDETONE control to obtain the sidetone level desired by the operator. Tighten the locknut, being careful not to disturb the setting of the control.

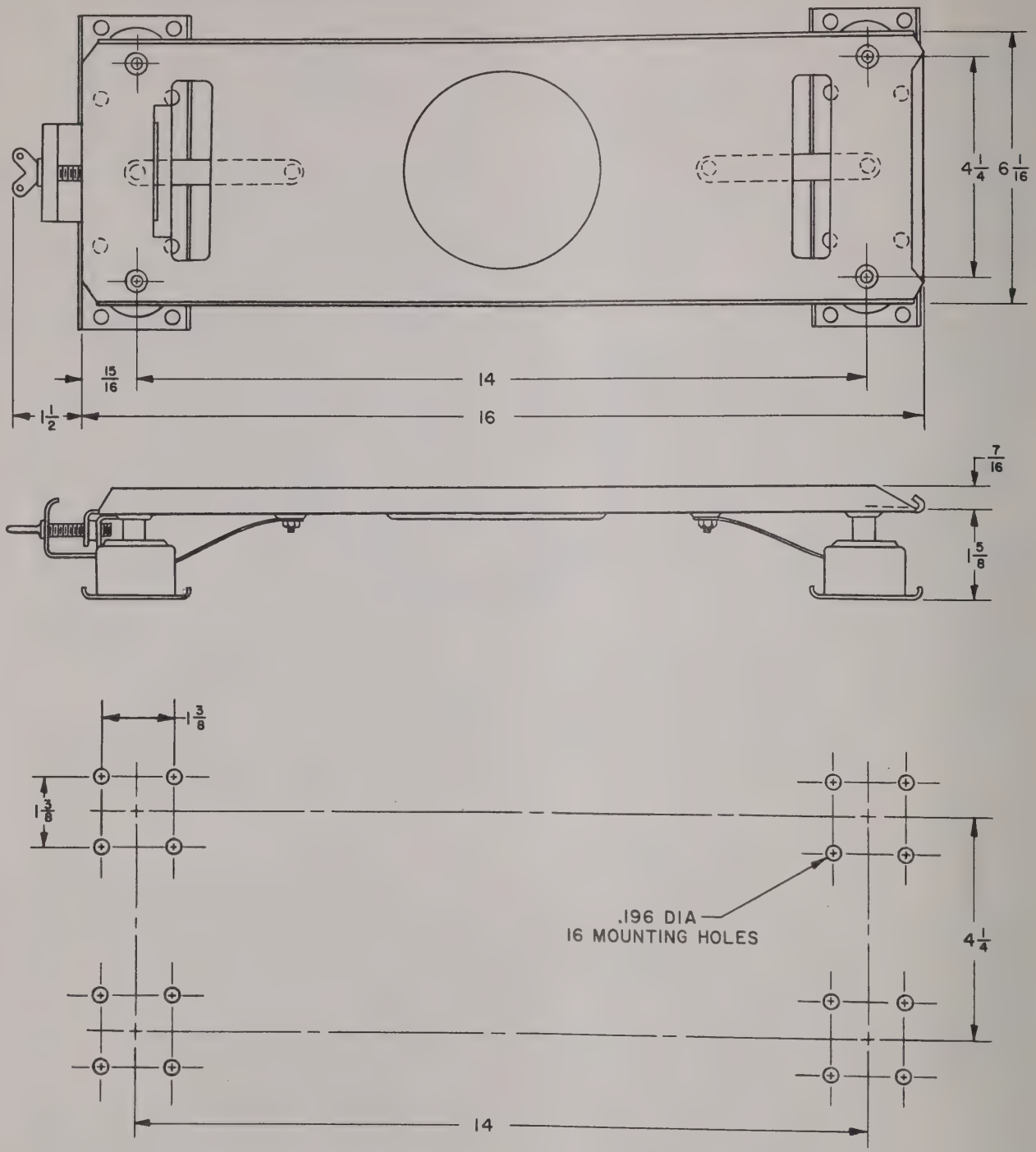


NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. HEAT DISSIPATION:
   TRANSMIT - 125 WATTS
   RECEIVE - 75 WATTS
3. WEIGHT: 13.8 LB INCLUDING MOUNTING.

TP1167

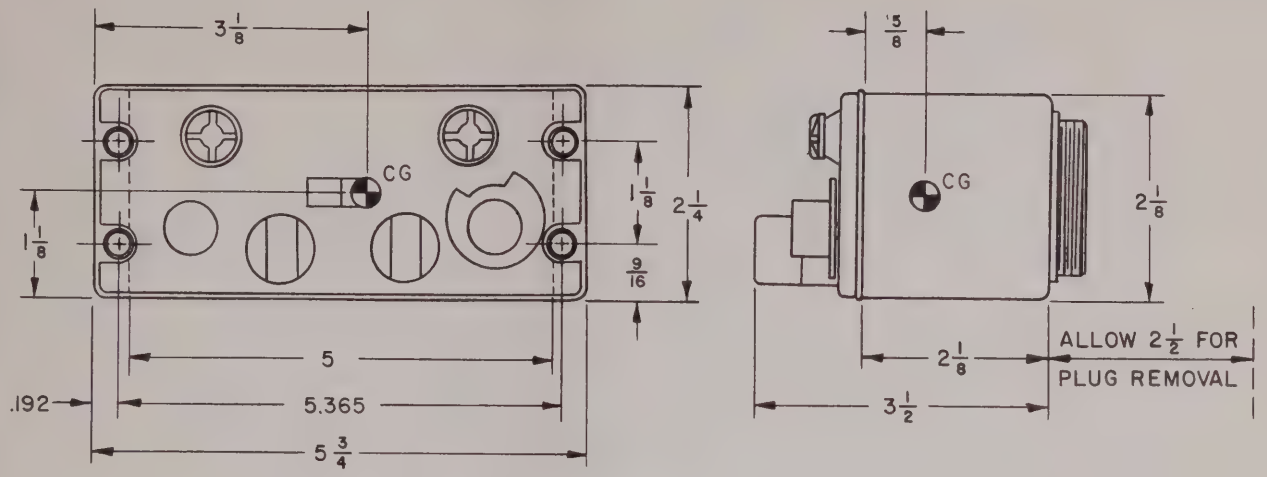
Figure 2–1. ARC Type RT-11A Receiver-Transmitter, Outline Dimensions



NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. WEIGHT: 1.6 LB.

Figure 2–2. ARC Type M-31A Mounting, Outline Dimensions

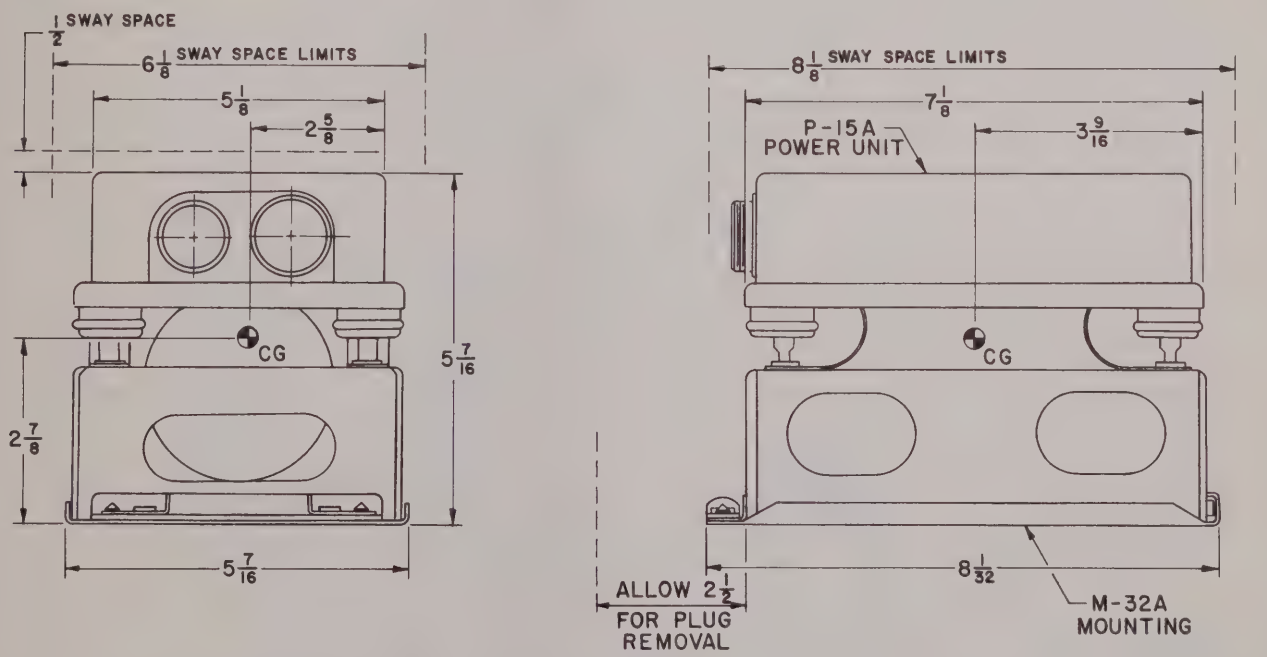
TP1169



NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. HEAT DISSIPATION: 2.5 WATTS.
3. WEIGHT: 1.3 LB.

TP1165

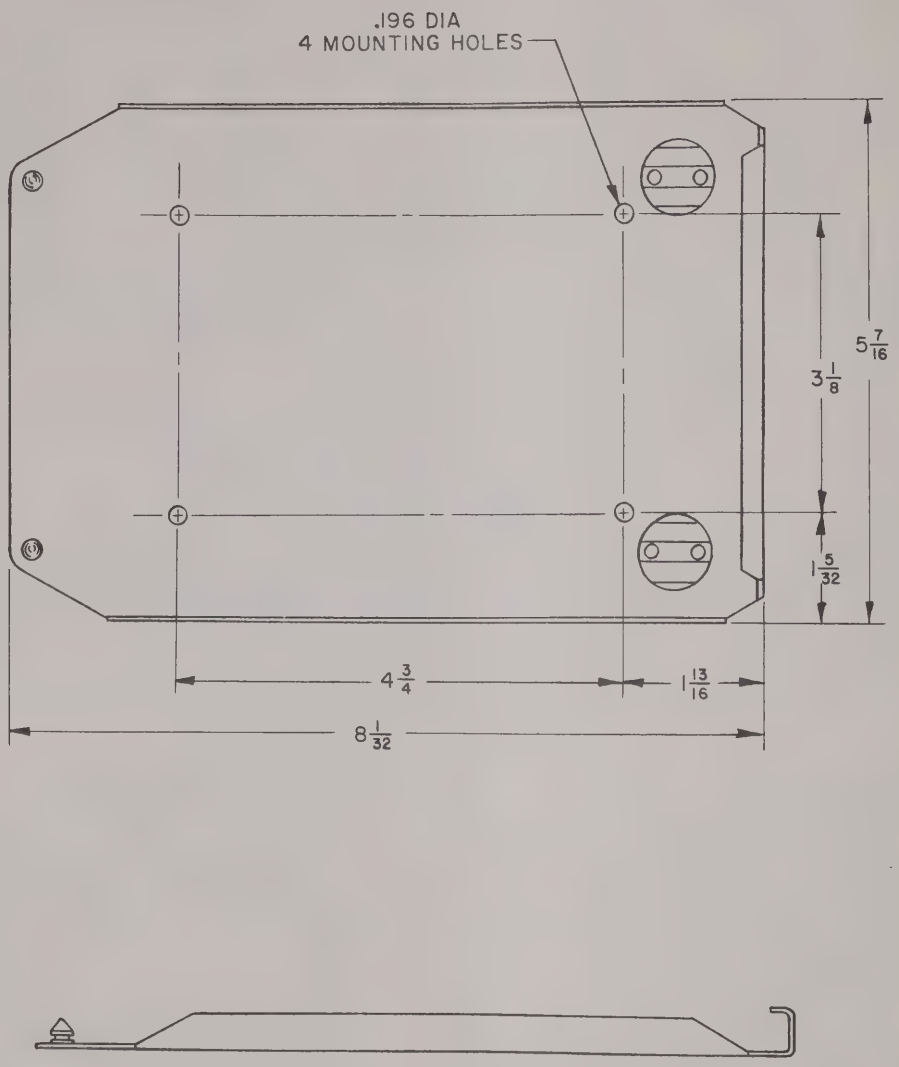
Figure 2–3. ARC Type C-67A Control Unit, Outline Dimensions



NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. HEAT DISSIPATION: TRANSMIT - 55 WATTS.
   RECEIVE - 46 WATTS.
3. WEIGHT: 6.8 LB INCLUDING MOUNTING.

TP1171

Figure 2–4. ARC Type P-15A Power Unit, Outline Dimensions

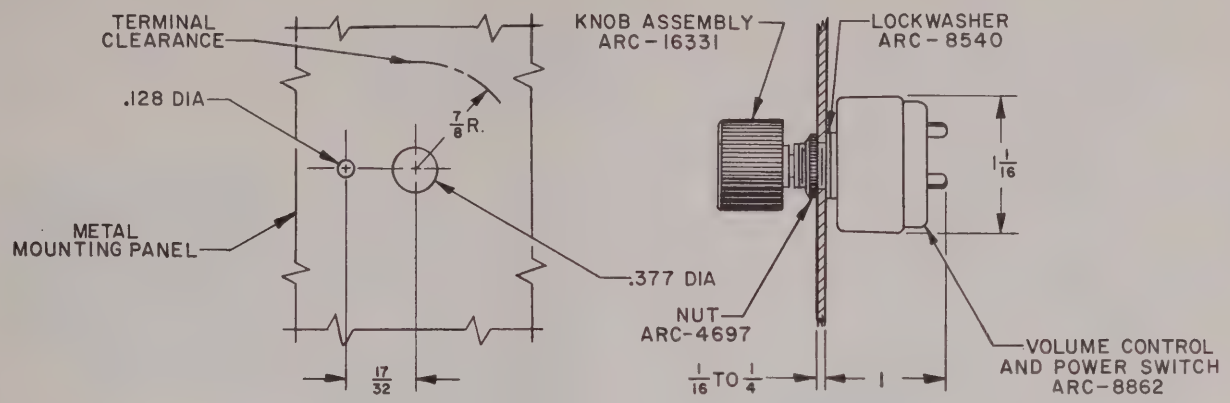


NOTES:

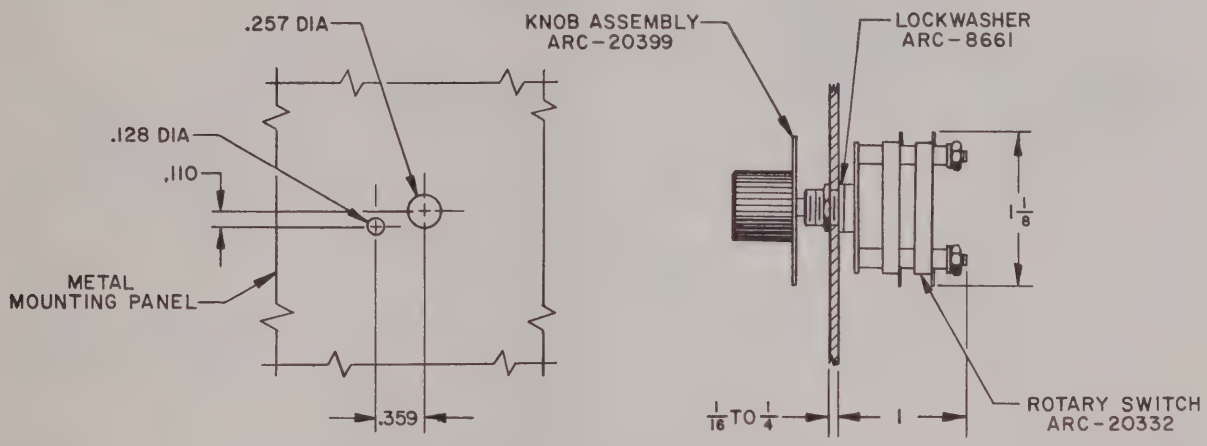
1. ALL DIMENSIONS ARE IN INCHES.
2. WEIGHT: 0.3 LB.

TP1173

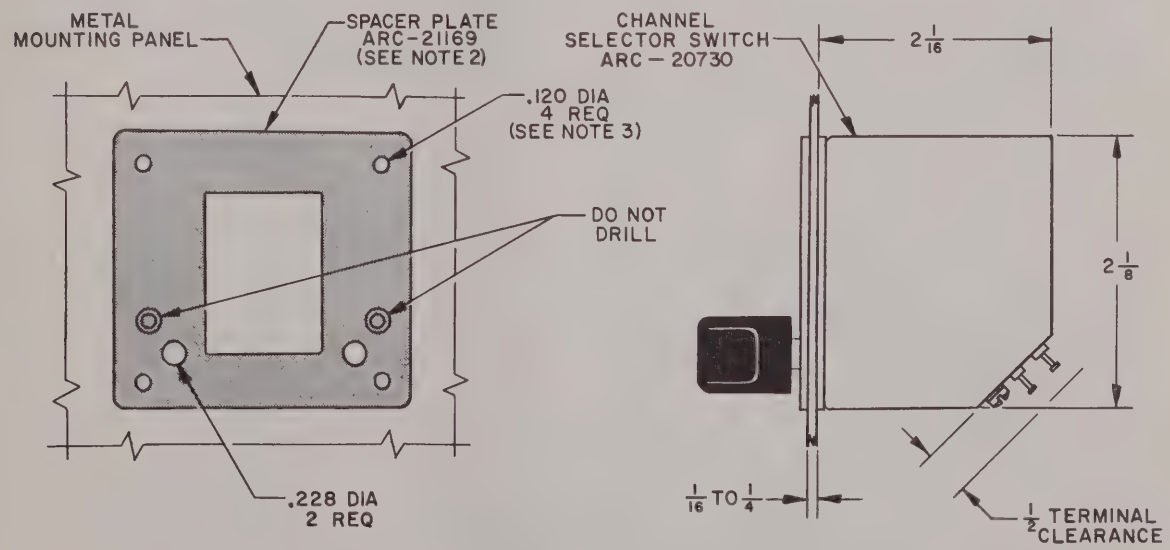
Figure 2–5. ARC Type M-32A Mounting, Outline Dimensions



VOLUME CONTROL AND POWER SWITCH



ROTARY SWITCH (SCS-DCS)

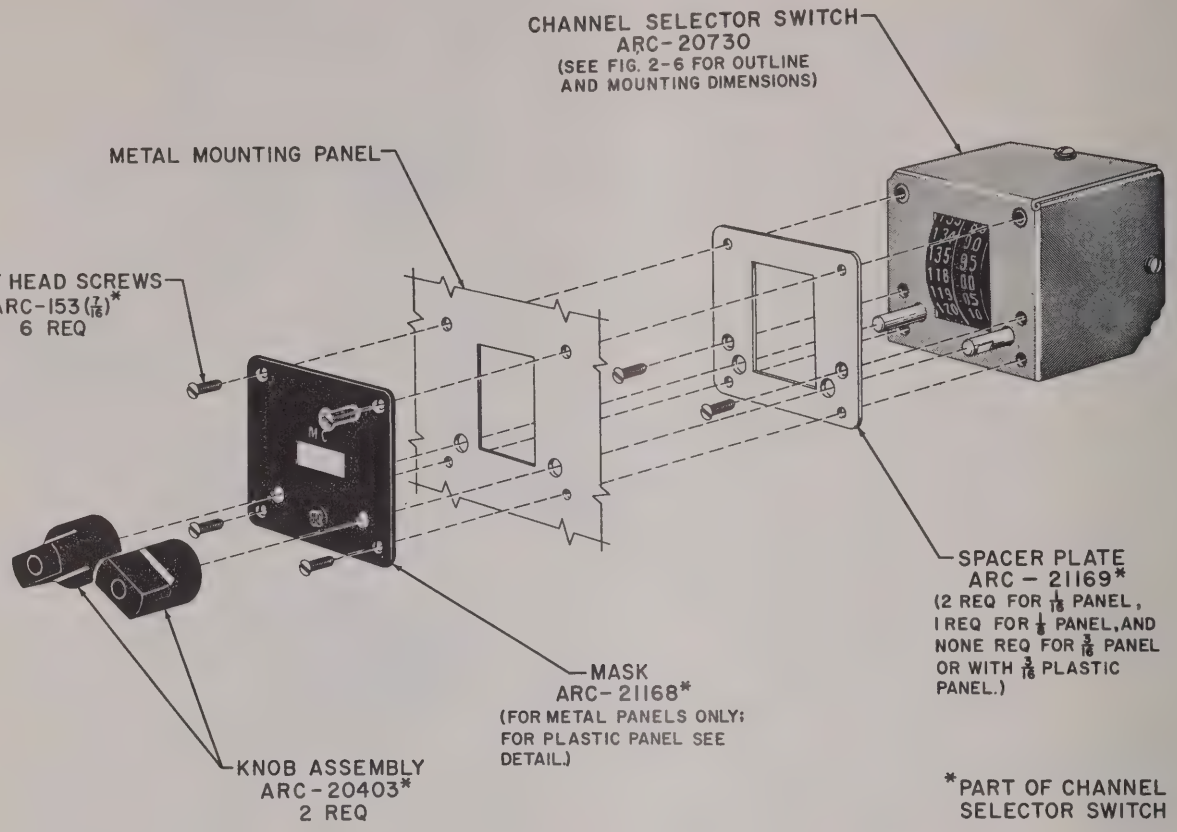


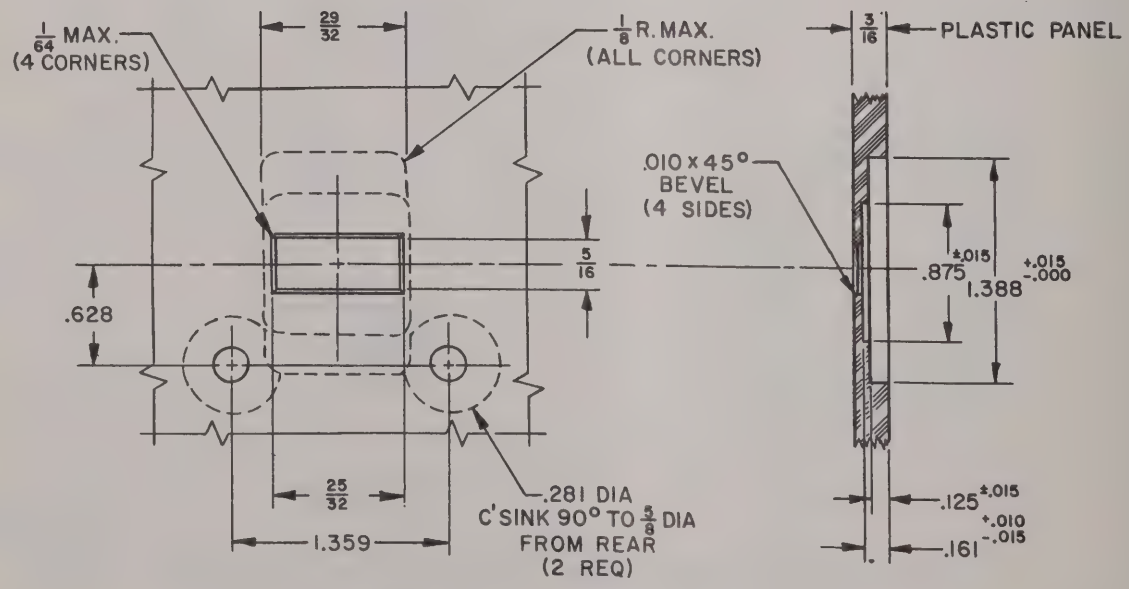
CHANNEL SELECTOR SWITCH

NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. FOR LAYOUT, USE ARC-21169 SPACER PLATE AS TEMPLATE.
3. IF 3/16-INCH PLASTIC PANEL IS USED, COUNTERSINK HOLES 82° IN METAL MOUNTING PANEL TO 0.223 DIAMETER.

TP1157A

Figure 2–6. ARC Type 210 Custom Control Parts, Mounting Dimensions


CHANNEL SELECTOR SWITCH
ARC-20730
(SEE FIG. 2-6 FOR OUTLINE AND MOUNTING DIMENSIONS)
METAL MOUNTING PANEL
FLAT HEAD SCREWS
ARC-153(7/16)*
6 REQ
SPACER PLATE
ARC - 21169*
(2 REQ FOR 1/16 PANEL, 1 REQ FOR 1/8 PANEL, AND NONE REQ FOR 3/16 PANEL OR WITH 3/16 PLASTIC PANEL.)
MASK
ARC-21168*
(FOR METAL PANELS ONLY; FOR PLASTIC PANEL SEE DETAIL.)
KNOB ASSEMBLY
ARC-20403*
2 REQ
*PART OF CHANNEL SELECTOR SWITCH



NOTE:

1. ALL DIMENSIONS ARE IN INCHES.

TP1155

Figure 2–7. Channel Selector Switch ARC-20730, Assembly Details

NOTES:

1. USE ARC-16115 FOR C
   RECEIVER-TRANSMIT
2. ALL WIRES, EXCEPT
   INSULATED, AIRCRA
3. WIRES MARKED "T"
   INSULATED.
4. SWITCH SECTIONS S1
   SECTION IS LOCATED
5. TO ASSURE PROPER
   AIRCRAFT SURFACE
   ARE ATTACHED MUS
6. FOR INSTALLATION
   SEE FIGURES 2-11 AN
7. FOR SCHEMATIC AND
   SWITCH ASSEMBLY A

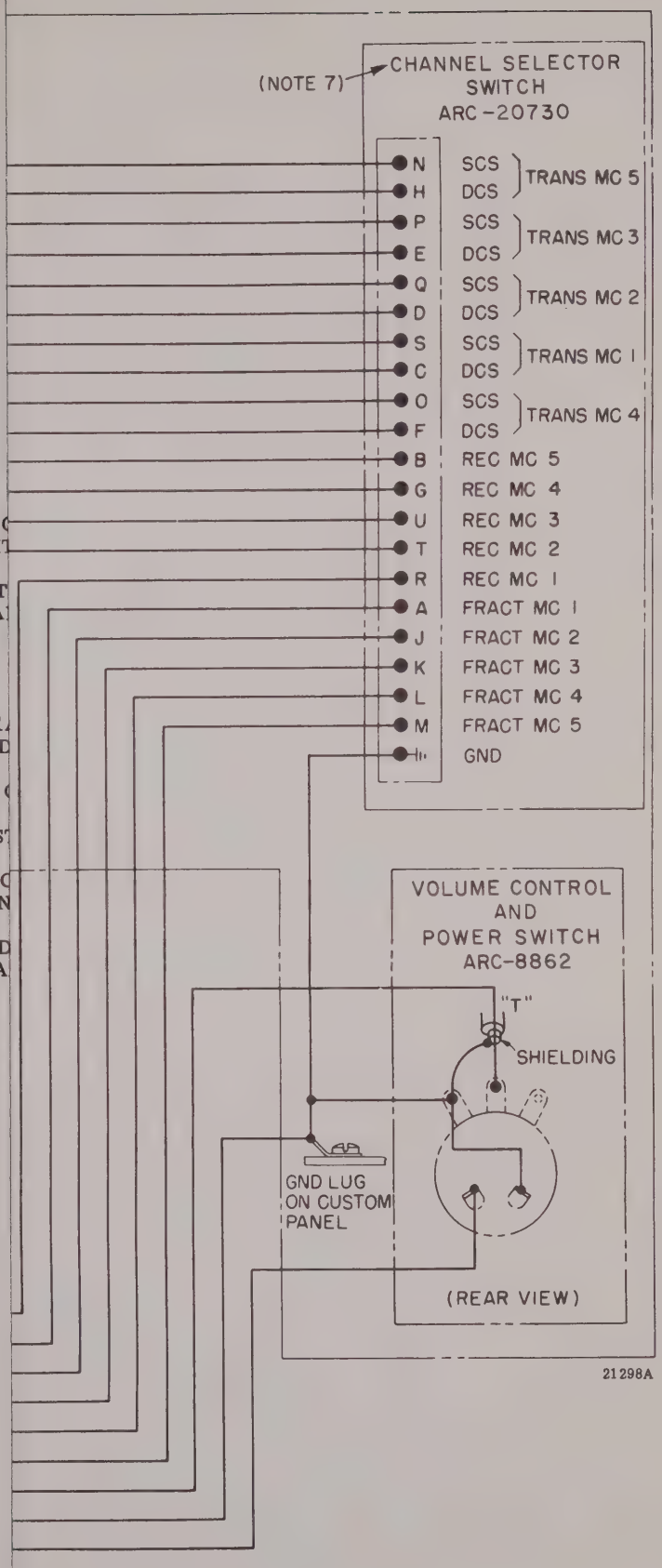
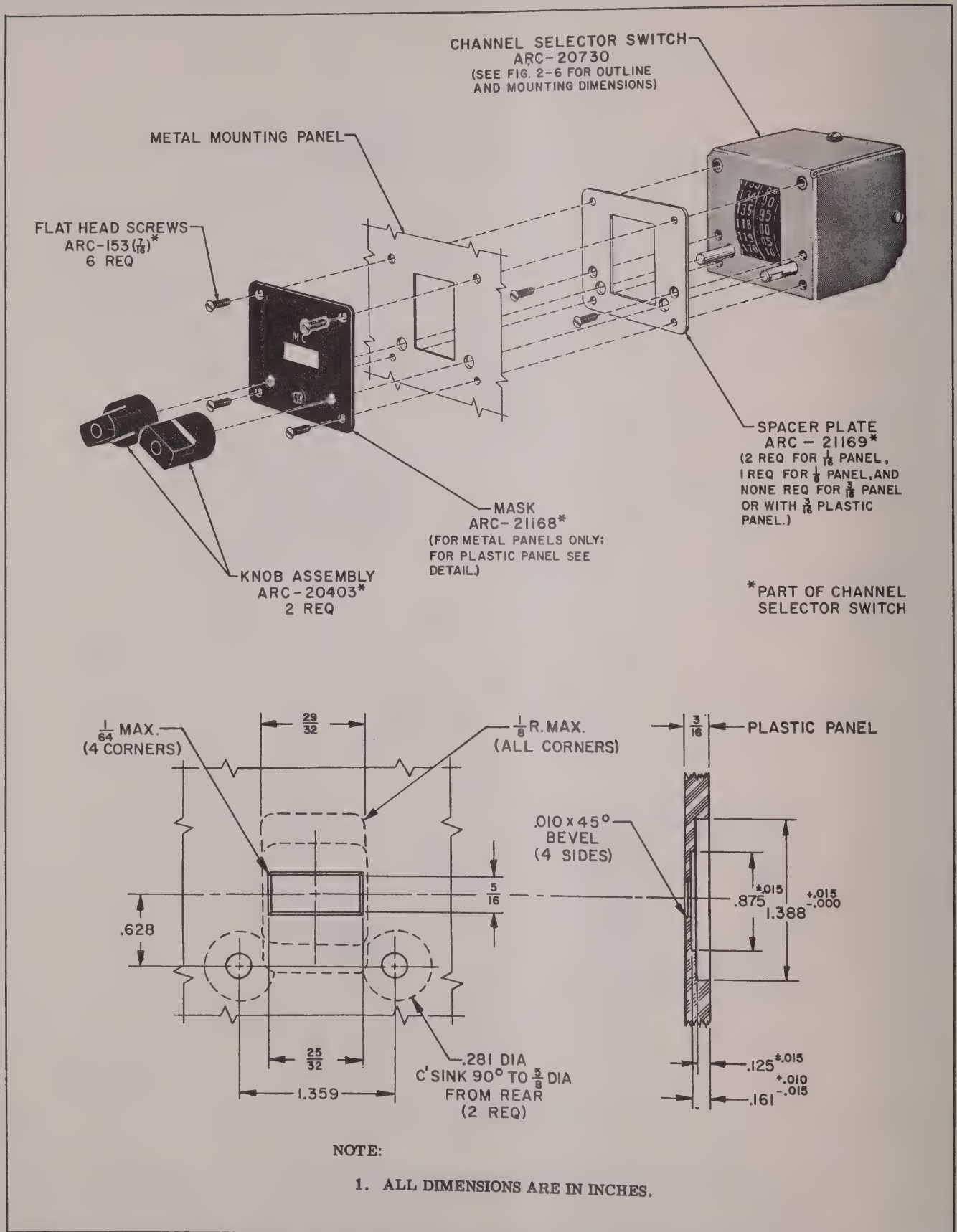


Figure 2–8. ARC Type 210 Custom Control Parts, Wiring Diagram



NOTE:

1. ALL DIMENSIONS ARE IN INCHES.

Figure 2–7. Channel Selector Switch ARC-20730, Assembly Details

TP1155

NOTES:

1. USE ARC-16115 FOR CABLE CONNECTION TO J206 OF RT-11A RECEIVER-TRANSMITTER.
2. ALL WIRES, EXCEPT THOSE MARKED "T, "ARE #20 STRANDED COPPER, INSULATED, AIRCRAFT WIRE.
3. WIRES MARKED "T" ARE # 20 STRANDED COPPER, SHIELDED, INSULATED.
4. SWITCH SECTIONS S1A AND S1B ARE SHOWN IN DCS POSITION. S1B SECTION IS LOCATED NEAREST PANEL.
5. TO ASSURE PROPER GROUNDING OF THIS SYSTEM, THE AIRCRAFT SURFACE TO WHICH ALL MOUNTINGS OR UNITS ARE ATTACHED MUST BE CLEAN, BARE METAL.
6. FOR INSTALLATION OF OTHER UNITS IN THE TYPE 210 SYSTEM, SEE FIGURES 2-11 AND 2-12.
7. FOR SCHEMATIC AND WIRING DIAGRAMS OF CHANNEL SELECTOR SWITCH ASSEMBLY ARC-20730, SEE FIGURES 2-9 AND 2-10.

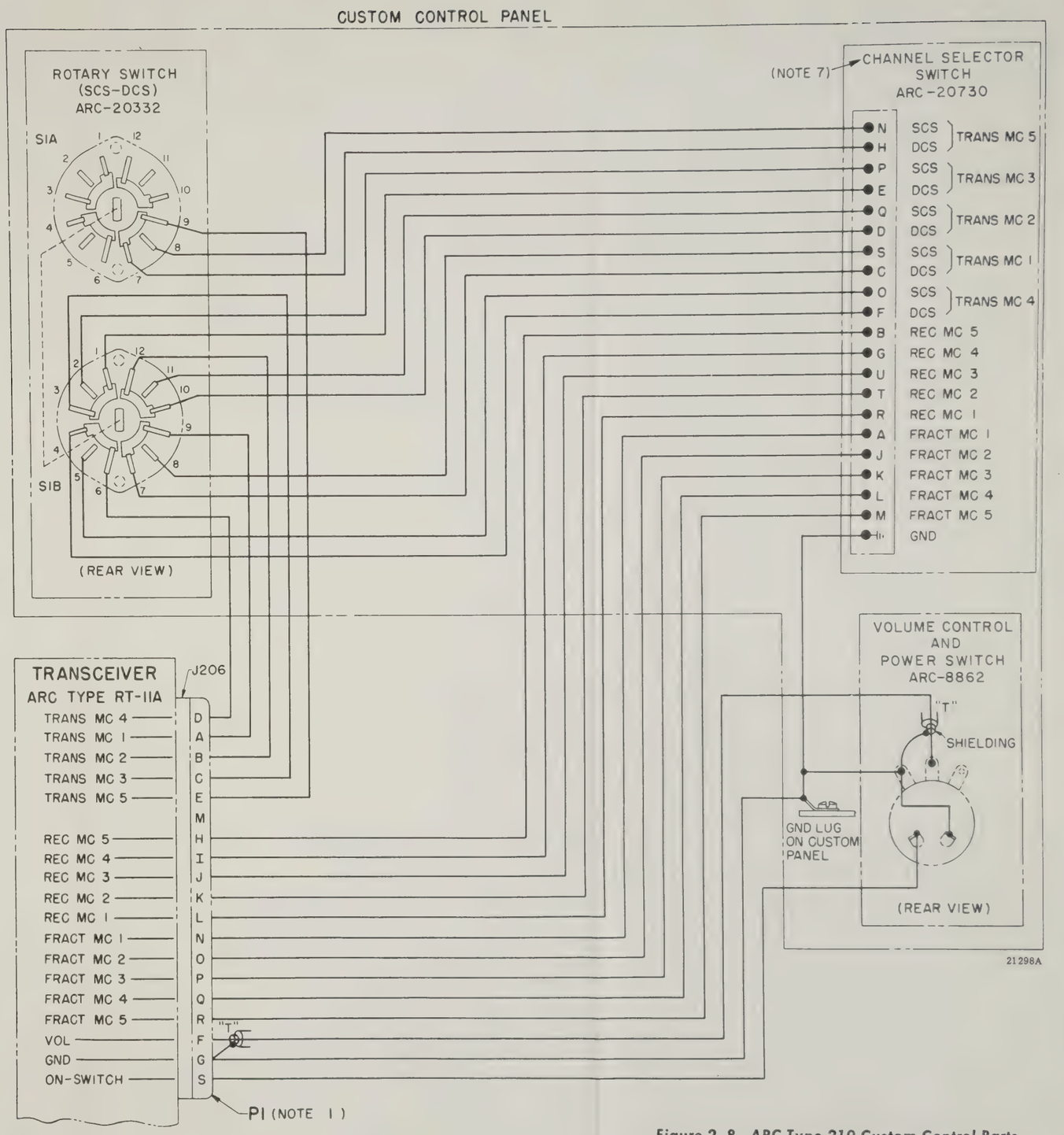
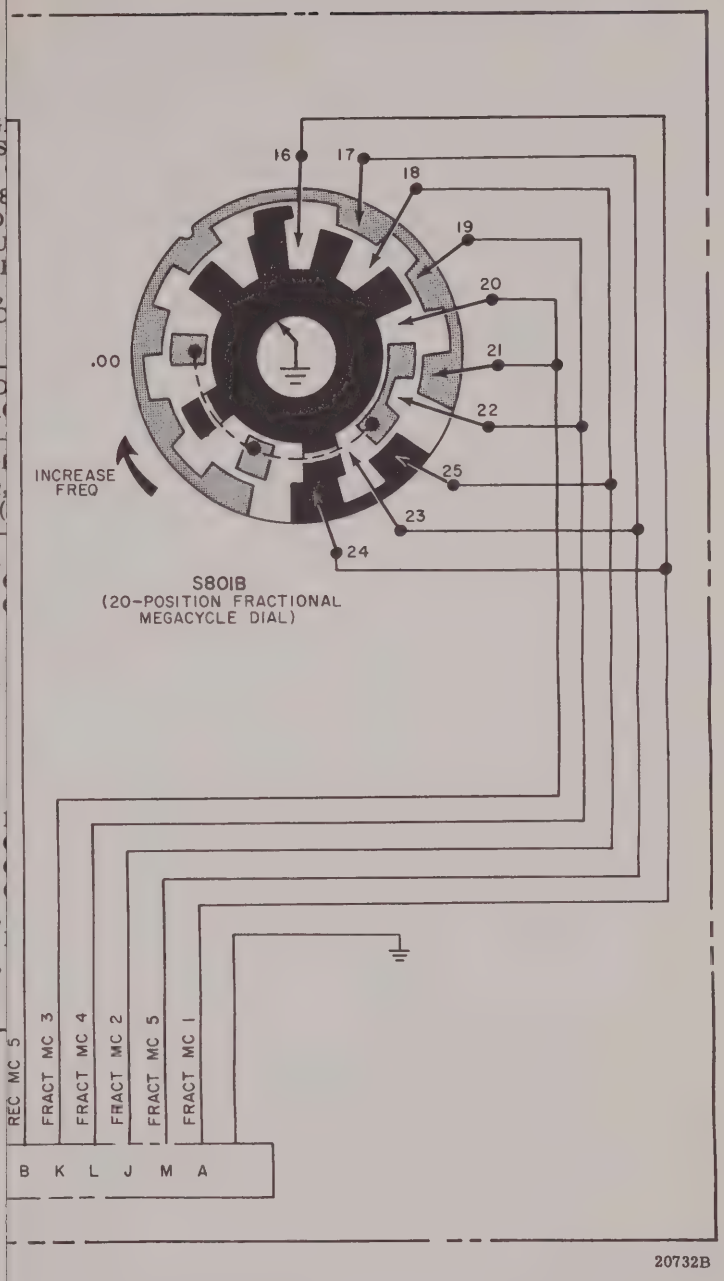


Figure 2–8. ARC Type 210 Custom Control Parts, Wiring Diagram

NOTES:

1. FOR WIRING DIAG
2. SWITCH SECTIONS
3. S801A CONTROLS
   C, D, E, F, H. S8
   EACH POSITION O
   GROUP ARE GROU
   CONNECTED TOGI
4. TERMINALS C, D,
   EXTERNAL SWITC

TABULATIO IN EA		
S801A	GROUP B, G, U, T, R	G S, Q, (
118	B, G, T	P,
119	B, G, U, R	S, (
120	B, G, U, T	S, (
121	G, U, T, R	Q,
122	U, T, R	P,
123	T, R	O,
124	B, R	N
125	G	S
126	U	Q
127	T	P
128	R	O
129	B	S,
130	B, G	S, (
131	G, U	S, (
132	U, T	S, (
133	B, T, R	Q,
134	G, R	S,
135	B, U	Q,



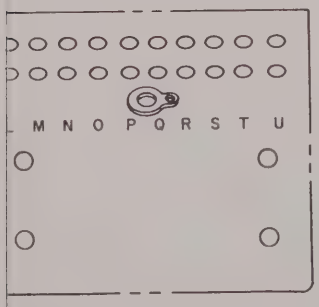


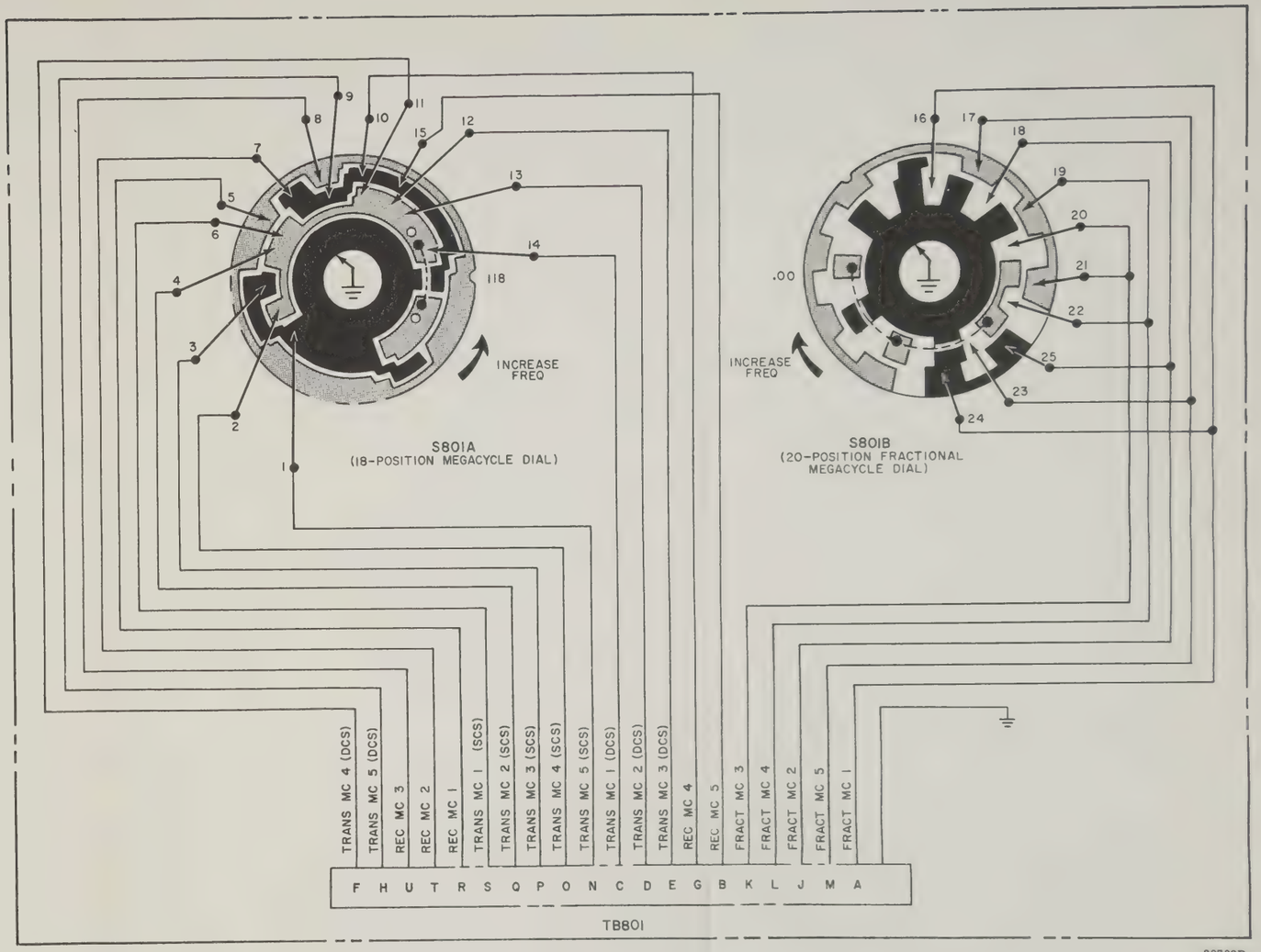
Figure 2–9. Channel Selector Switch ARC-20730, Schematic Diagram

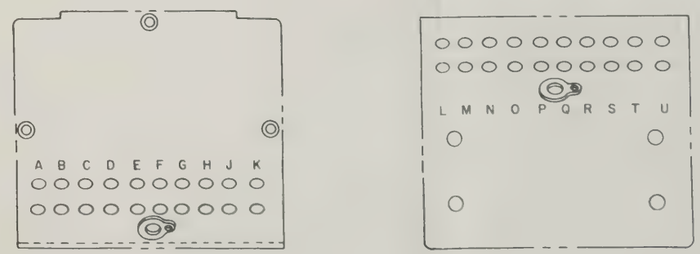
NOTES:

1. FOR WIRING DIAGRAM, SEE FIGURE 2-10.
2. SWITCH SECTIONS S801A AND S801B ARE SHOWN IN 118.00-MC POSITION.
3. S801A CONTROLS TERMINAL GROUPS B, G, U, T, R; S, Q, P, O, N; AND C, D, E, F, H. S801B CONTROLS TERMINAL GROUP A, J, K, L, M. AT EACH POSITION OF S801A AND S801B, CERTAIN TERMINALS IN EACH GROUP ARE GROUNDED AND THE OTHER TERMINALS OF THE GROUP ARE CONNECTED TOGETHER FREE OF GROUND.
4. TERMINALS C, D, E, F, AND H ARE FOR "DCS" OPERATION FROM AN EXTERNAL SWITCH. SEE TABLE AND FIGURE 2-16.

TABULATION OF GROUNDED TERMINALS IN EACH GROUP (NOTES 3 & 4)

S801A	GROUP B, G, U, T, R	GROUP S, Q, P, O, N (SCS)	GROUP C, D, E, F, H (DCS)	S801B	GROUP A, J, K, L, M
118	B, G, T	P, N	H	.00	A, J
119	B, G, U, R	S, O	C	.05	A, J, K
120	B, G, U, T	S, Q, N	D	.10	A, M
121	G, U, T, R	Q, P	E	.15	A, J, K, L
122	U, T, R	P, O	F	.20	L
123	T, R	O, N	C, H	.25	J, K, L, M
124	B, R	N	C, D	.30	K
125	G	S	C, D, E	.35	A, K, L, M
126	U	Q	C, D, E, F	.40	J
127	T	P	D, E, F, H	.45	J, L, M
128	R	O	C, E, F, H	.50	A
129	B	S, N	D, F, H	.55	A, K, M
130	B, G	S, Q	E, H	.60	M
131	G, U	S, Q, P	C, F	.65	J, L
132	U, T	S, Q, P, O	C, D, H	.70	L, M
133	B, T, R	Q, P, O, N	D, E	.75	K, M
134	G, R	S, P, O, N	E, F	.80	K, L
135	B, U	Q, O, N	F, H	.85	A, L
				.90	J, K
				.95	A, J, M



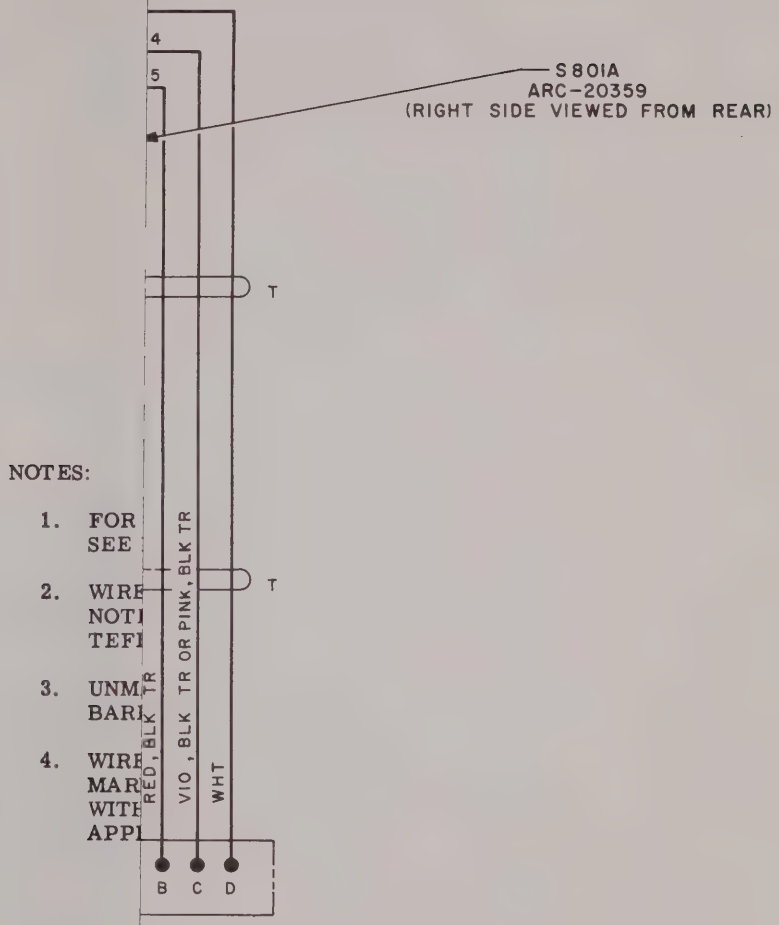


TB801
OUTSIDE VIEW

CONNECTED TO GROUND

INSULATED FROM GROUND AND CONNECTED TOGETHER

Figure 2–9. Channel Selector Switch ARC-20730, Schematic Diagram



NOTES:

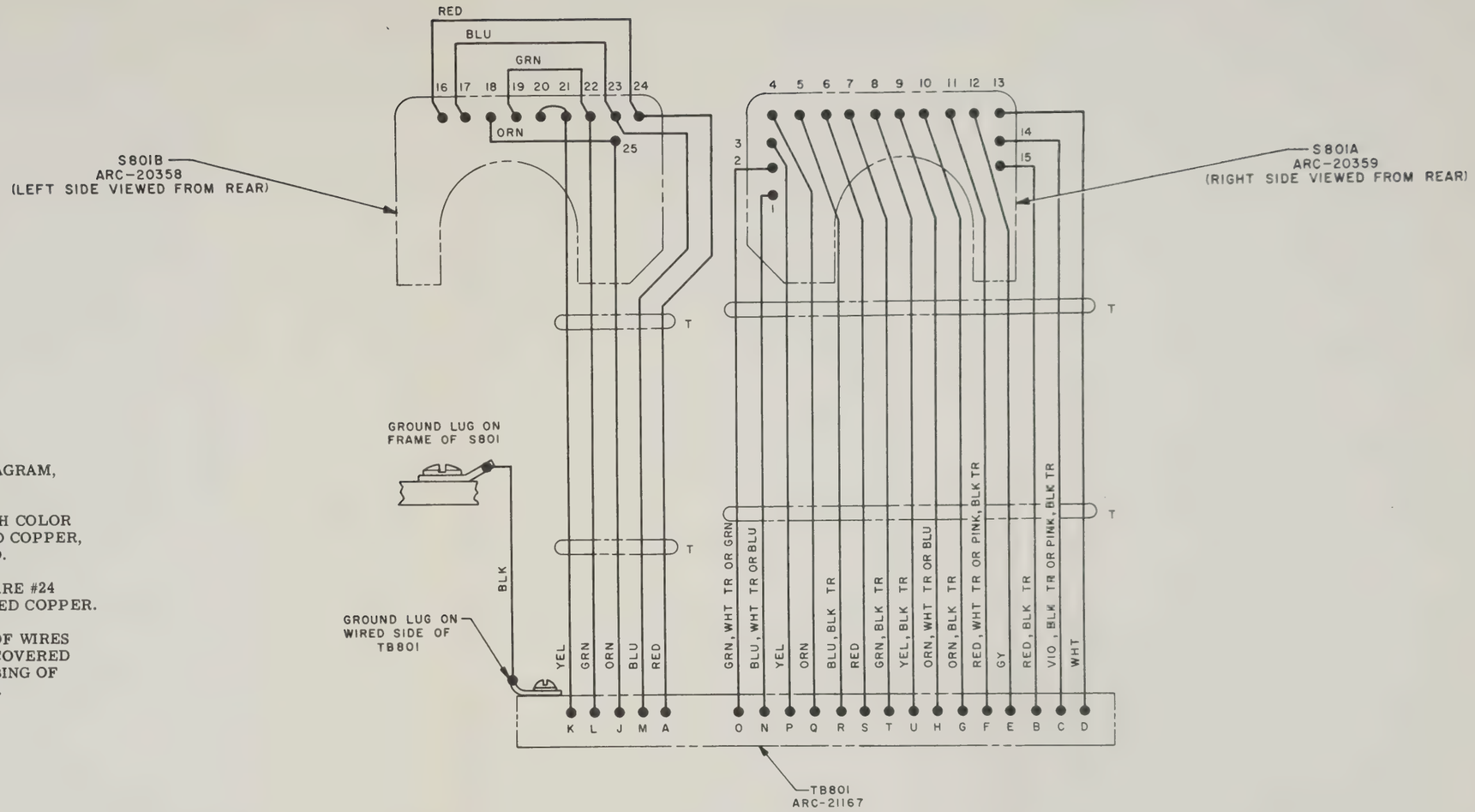
1. FOR
   SEE
2. WIRE
   NOTI
   TEFI
3. UNM
   BARI
4. WIRE
   MAR
   WITH
   APPI

20731F

Figure 2–10. Channel Selector Switch ARC-20730, Wiring Diagram

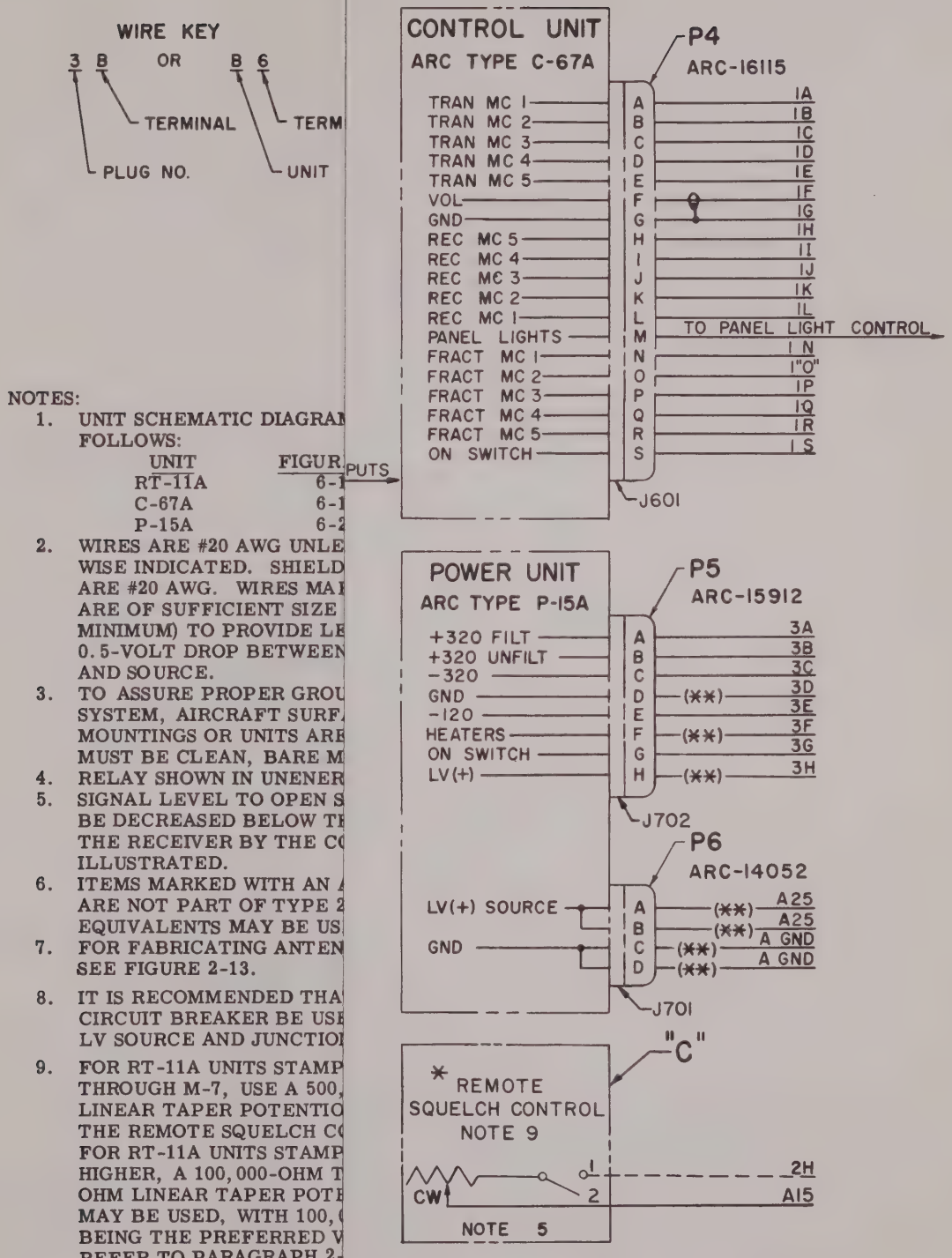
NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 2-9.
2. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
3. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.
4. WIRES OR GROUPS OF WIRES MARKED "T" ARE COVERED WITH VINYLITE TUBING OF APPROPRIATE SIZE.



20731F

Figure 2–10. Channel Selector Switch ARC-20730, Wiring Diagram



NOTES:

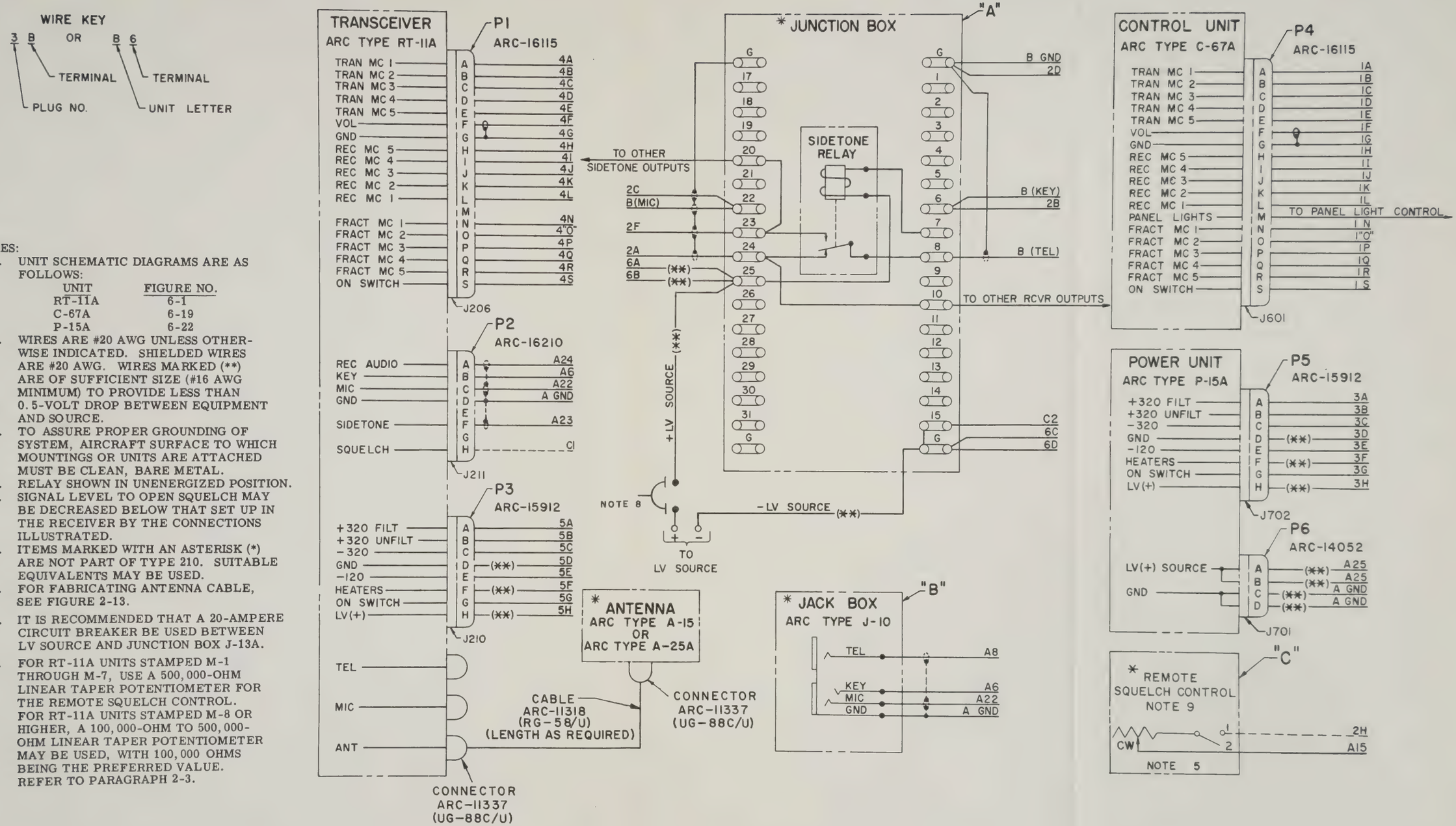
1. UNIT SCHEMATIC DIAGRAM FOLLOWS:

UNIT	FIGURE
RT-11A	6-1
C-67A	6-1
P-15A	6-2

2. WIRES ARE #20 AWG UNLESS OTHERWISE INDICATED. SHIELDED WIRES ARE #20 AWG. WIRES MARKED * ARE OF SUFFICIENT SIZE (#16 AWG MINIMUM) TO PROVIDE LESS THAN 0.5-VOLT DROP BETWEEN P15A AND SOURCE.
3. TO ASSURE PROPER GROUNDING OF SYSTEM, AIRCRAFT SURFACE AT MOUNTINGS OR UNITS ARE PAINTED MUST BE CLEAN, BARE METAL.
4. RELAY SHOWN IN UNENERGIZED
5. SIGNAL LEVEL TO OPEN SQUELCH MUST BE DECREASED BELOW THAT AT THE RECEIVER BY THE CONTROL ILLUSTRATED.
6. ITEMS MARKED WITH AN ASTERISK ARE NOT PART OF TYPE 210 EQUIVALENTS MAY BE USED.
7. FOR FABRICATING ANTENNA CABLE, SEE FIGURE 2-13.
8. IT IS RECOMMENDED THAT A 5-AMP CIRCUIT BREAKER BE USED IN THE LV SOURCE AND JUNCTION BOX.
9. FOR RT-11A UNITS STAMPED M-6 THROUGH M-7, USE A 500,000-OHM LINEAR TAPER POTENTIOMETER FOR THE REMOTE SQUELCH CONTROL. FOR RT-11A UNITS STAMPED M-8 OR HIGHER, A 100,000-OHM TO 500,000-OHM LINEAR TAPER POTENTIOMETER MAY BE USED, WITH 100,000 OHMS BEING THE PREFERRED VALUE. REFER TO PARAGRAPH 2-

21264I

Figure 2–11. ARC Type 210 VHF Communication Equipment with Sidetone Relay, Interconnecting Diagram



NOTES:

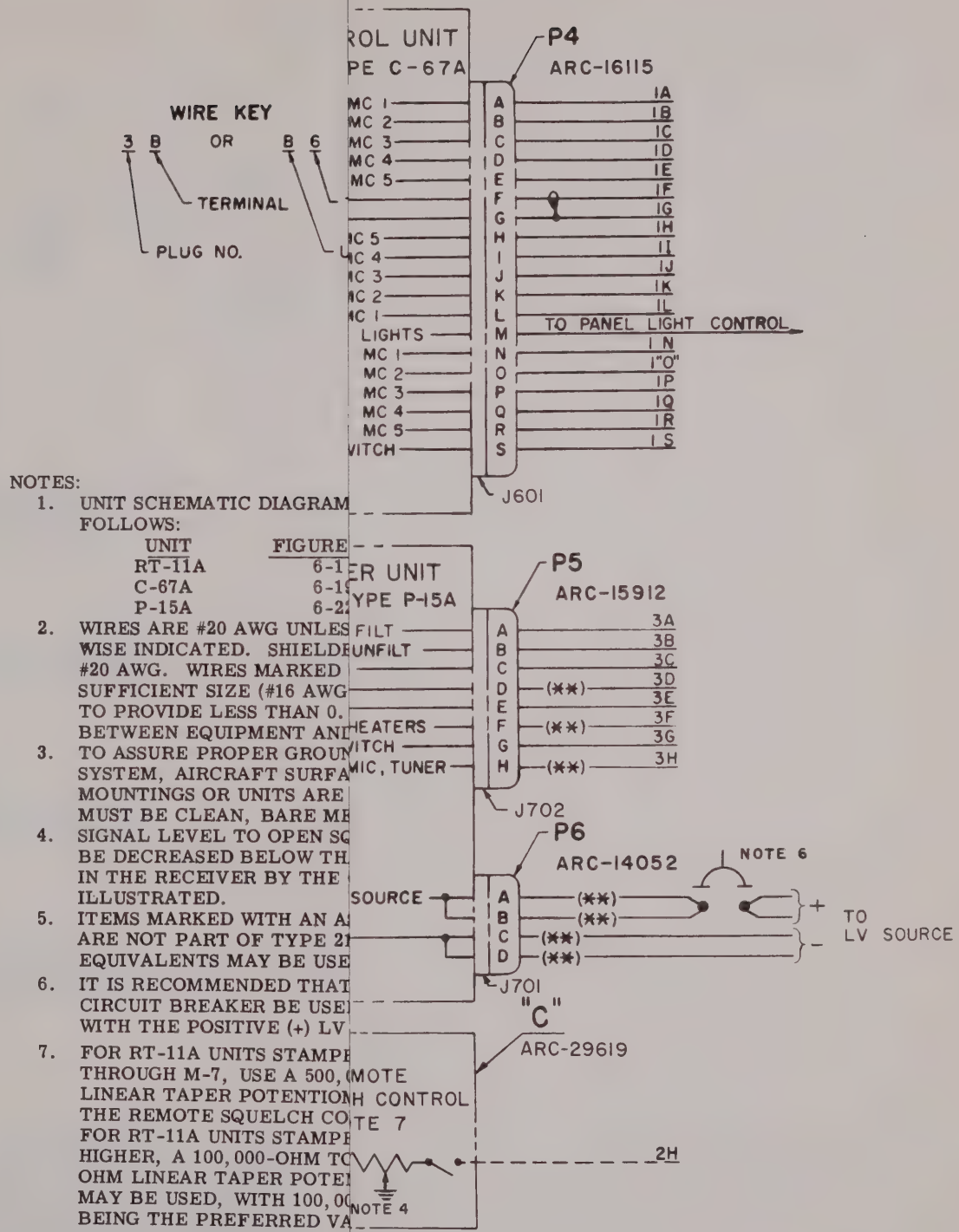
1. UNIT SCHEMATIC DIAGRAMS ARE AS FOLLOWS:

UNIT	FIGURE NO.
RT-11A	6-1
C-67A	6-19
P-15A	6-22

2. WIRES ARE #20 AWG UNLESS OTHERWISE INDICATED. SHIELDED WIRES ARE #20 AWG. WIRES MARKED (**) ARE OF SUFFICIENT SIZE (#16 AWG MINIMUM) TO PROVIDE LESS THAN 0.5-VOLT DROP BETWEEN EQUIPMENT AND SOURCE.
3. TO ASSURE PROPER GROUNDING OF SYSTEM, AIRCRAFT SURFACE TO WHICH MOUNTINGS OR UNITS ARE ATTACHED MUST BE CLEAN, BARE METAL.
4. RELAY SHOWN IN UNENERGIZED POSITION.
5. SIGNAL LEVEL TO OPEN SQUELCH MAY BE DECREASED BELOW THAT SET UP IN THE RECEIVER BY THE CONNECTIONS ILLUSTRATED.
6. ITEMS MARKED WITH AN ASTERISK (*) ARE NOT PART OF TYPE 210. SUITABLE EQUIVALENTS MAY BE USED.
7. FOR FABRICATING ANTENNA CABLE, SEE FIGURE 2-13.
8. IT IS RECOMMENDED THAT A 20-AMPERE CIRCUIT BREAKER BE USED BETWEEN LV SOURCE AND JUNCTION BOX J-13A.
9. FOR RT-11A UNITS STAMPED M-1 THROUGH M-7, USE A 500,000-OHM LINEAR TAPER POTENTIOMETER FOR THE REMOTE SQUELCH CONTROL. FOR RT-11A UNITS STAMPED M-8 OR HIGHER, A 100,000-OHM TO 500,000-OHM LINEAR TAPER POTENTIOMETER MAY BE USED, WITH 100,000 OHMS BEING THE PREFERRED VALUE. REFER TO PARAGRAPH 2-3.

212641

Figure 2-11. ARC Type 210 VHF Communication Equipment with Sidetone Relay, Interconnecting Diagram



NOTES:

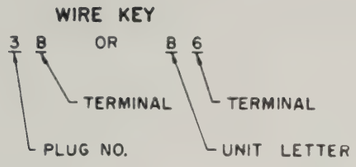
1. UNIT SCHEMATIC DIAGRAM
   FOLLOWS:

UNIT	FIGURE
RT-11A	6-1
C-67A	6-1
P-15A	6-2

2. WIRES ARE #20 AWG UNLES
   WISE INDICATED. SHIELDE
   #20 AWG. WIRES MARKED
   SUFFICIENT SIZE (#16 AWG
   TO PROVIDE LESS THAN 0.
   BETWEEN EQUIPMENT ANI
3. TO ASSURE PROPER GROUN
   SYSTEM, AIRCRAFT SURFA
   MOUNTINGS OR UNITS ARE
   MUST BE CLEAN, BARE ME
4. SIGNAL LEVEL TO OPEN SQ
   BE DECREASED BELOW TH
   IN THE RECEIVER BY THE
   ILLUSTRATED.
5. ITEMS MARKED WITH AN A
   ARE NOT PART OF TYPE 21
   EQUIVALENTS MAY BE USE
6. IT IS RECOMMENDED THAT
   CIRCUIT BREAKER BE USE
   WITH THE POSITIVE (+) LV
7. FOR RT-11A UNITS STAMPE
   THROUGH M-7, USE A 500,
   LINEAR TAPER POTENTION
   THE REMOTE SQUELCH CO
   FOR RT-11A UNITS STAMPE
   HIGHER, A 100,000-OHM TC
   OHM LINEAR TAPER POTE
   MAY BE USED, WITH 100,0
   BEING THE PREFERRED VA
   REFER TO PARAGRAPH 2-3

21392D

Figure 2–12. ARC Type 210 VHF Communication Equipment without Sidetone Relay, Interconnecting Diagram

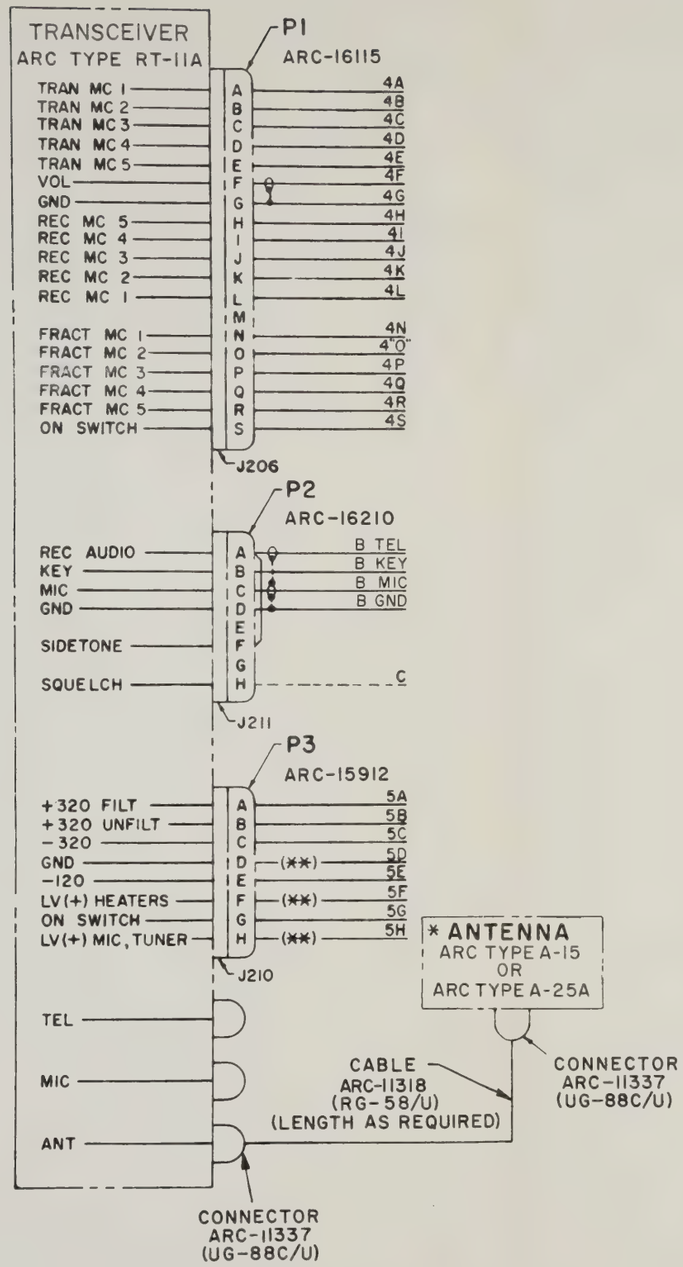


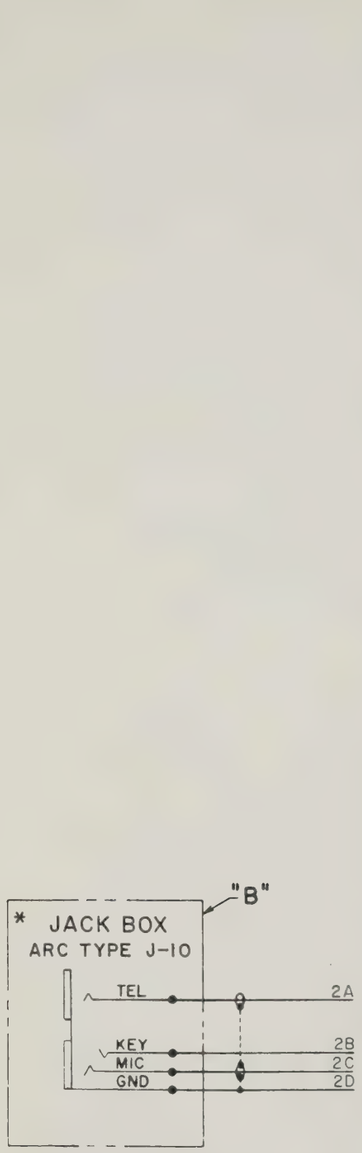
NOTES:

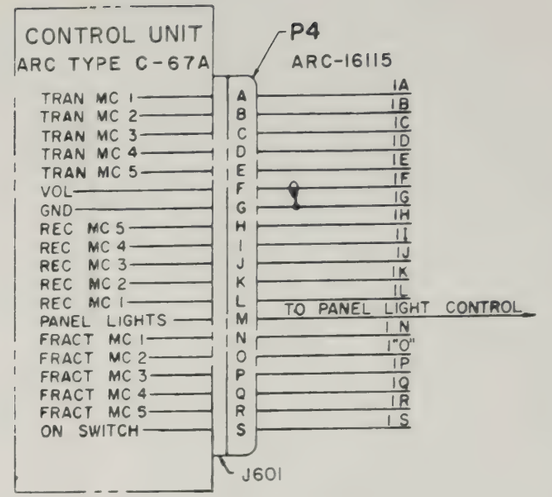
1. UNIT SCHEMATIC DIAGRAMS ARE AS FOLLOWS:

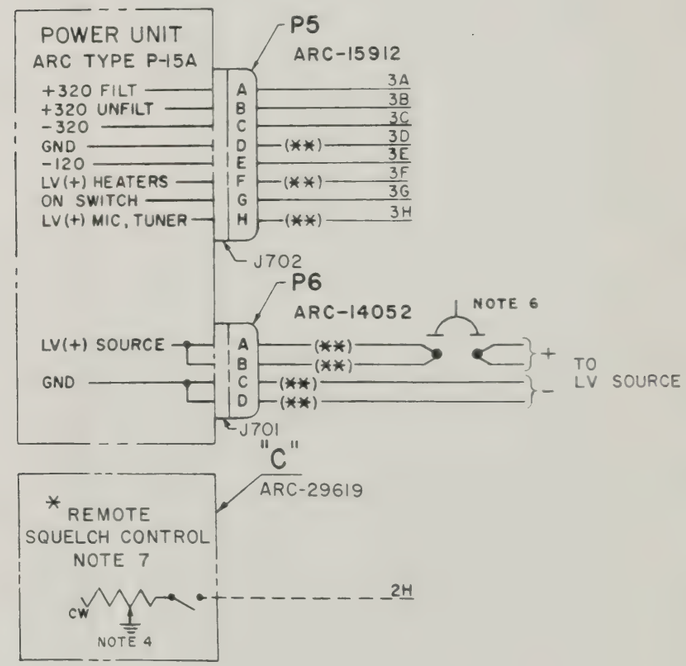
UNIT	FIGURE NO.
RT-11A	6-1
C-67A	6-19
P-15A	6-22

2. WIRES ARE #20 AWG UNLESS OTHERWISE INDICATED. SHIELDED WIRES ARE #20 AWG. WIRES MARKED (**) ARE OF SUFFICIENT SIZE (#16 AWG MINIMUM) TO PROVIDE LESS THAN 0.5-VOLT DROP BETWEEN EQUIPMENT AND SOURCE.
3. TO ASSURE PROPER GROUNDING OF SYSTEM, AIRCRAFT SURFACE TO WHICH MOUNTINGS OR UNITS ARE ATTACHED MUST BE CLEAN, BARE METAL.
4. SIGNAL LEVEL TO OPEN SQUELCH MAY BE DECREASED BELOW THAT SET UP IN THE RECEIVER BY THE CONNECTIONS ILLUSTRATED.
5. ITEMS MARKED WITH AN ASTERISK (*) ARE NOT PART OF TYPE 210. SUITABLE EQUIVALENTS MAY BE USED.
6. IT IS RECOMMENDED THAT A 20-AMPERE CIRCUIT BREAKER BE USED IN SERIES WITH THE POSITIVE (+) LV LINE.
7. FOR RT-11A UNITS STAMPED M-1 THROUGH M-7, USE A 500,000-OHM LINEAR TAPER POTENTIOMETER FOR THE REMOTE SQUELCH CONTROL. FOR RT-11A UNITS STAMPED M-8 OR HIGHER, A 100,000-OHM TO 500,000-OHM LINEAR TAPER POTENTIOMETER MAY BE USED, WITH 100,000 OHMS BEING THE PREFERRED VALUE. REFER TO PARAGRAPH 2-3.



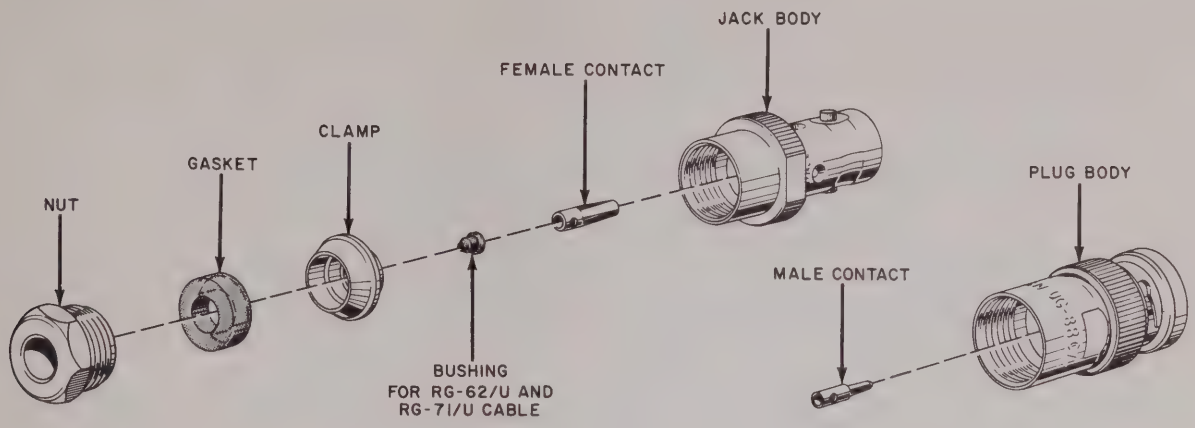


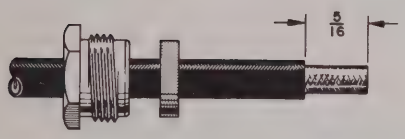




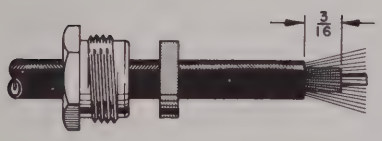
21392D

Figure 2–12. ARC Type 210 VHF Communication Equipment without Sidetone Relay, Interconnecting Diagram

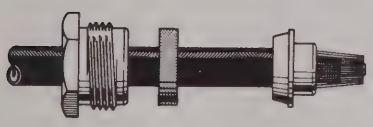




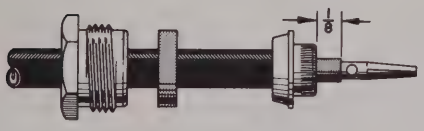
PLACE NUT AND GASKET OVER CABLE AND TRIM JACKET TO DIMENSION SHOWN. UNGROOVED FACE OF GASKET MUST BE TOWARD NUT.



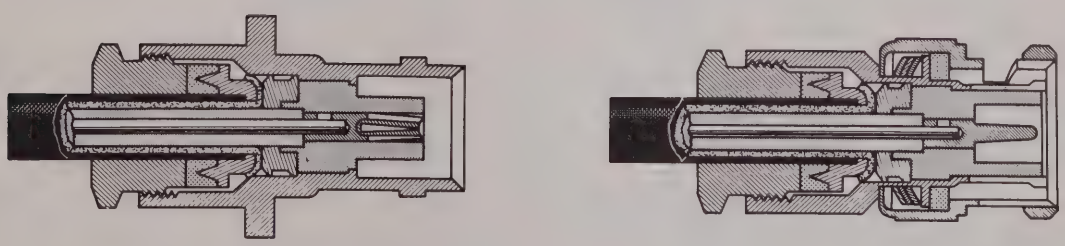
COMB OUT BRAID AND CUT CABLE DIELECTRIC TO DIMENSION SHOWN, BEING CAREFUL NOT TO NICK CENTER CONDUCTOR. TIN CENTER CONDUCTOR.



PULL BRAID WIRES FORWARD AND TAPER TOWARD CENTER CONDUCTOR. PLACE CLAMP OVER BRAID AND PUSH AGAINST CABLE JACKET.



FOLD BACK BRAID WIRES AS SHOWN, TRIM TO PROPER LENGTH, AND FORM OVER CLAMP AS SHOWN. FOR RG-62/U AND RG-71/U CABLE, SLIP BUSHING OVER CENTER CONDUCTOR AND UNDER DIELECTRIC. SOLDER CONTACT TO CENTER CONDUCTOR.



INSERT CABLE AND PARTS INTO CONNECTOR BODY. MAKE SURE SHARP EDGE OF CLAMP SEATS PROPERLY IN GASKET. TIGHTEN NUT.

Figure 2–13. Fabrication of Antenna Cable Assembly

TP1731

SECTION III
OPERATION

Note

Modifications of the RT-11A Receiver-Transmitter are identified by an "M" number stamped on the bottom of the main chassis. The information contained in this section is applicable to all models, unless noted otherwise.

3–1. OPERATING CONTROLS.

All controls required for operating the ARC Type 210 VHF Communication Equipment are located on the front panel of the C-67A Control Unit (see Figure 3–1). The functions of these controls are described in Table 3–1.

TABLE 3–1. OPERATING CONTROLS

Control	Function	Control	Function
Megacycle Channel Selector Switch (118 to 135 MC)	Selects the megacycle channel frequency to be used for receiving or transmitting during SCS operation, as indicated on the megacycle portion of the channel frequency dial (MC). During DCS operation, selects the megacycle channel frequency to be used for receiving, as indicated on the channel frequency dial, and the transmitting frequency (not indicated) which is 6.0 mc above the indicated frequency. Clockwise rotation of the selector knob increases frequency in 1.0-mc steps from 118 mc to 135 mc. Beyond 135 mc, the selector returns to 118 mc. The selector knob may be rotated in either direction to reach the desired megacycle frequency.	Fractional Megacycle Channel Selector Switch (0.00 to 0.95 MC)	Selects the fractional megacycle channel to be used for receiving or transmitting during SCS or DCS operation, as indicated on the fractional megacycle portion of the channel frequency dial (MC). Clockwise rotation of the selector knob increases frequency in 0.05-mc steps from 0.00 mc to 0.95 mc. Beyond 0.95 mc, the selector returns to 0.00 mc. The selector knob may be rotated in either direction to reach the desired fractional megacycle frequency.
Mode-of-Operation Switch (SCS-DCS)	Selects mode of operation: SCS (single-channel simplex; receive and transmit on same frequency) or DCS (double-channel simplex; transmit 6.0 mc above receiving frequency).	Volume Control and Power Switch (VOL-OFF)	Controls receiver audio level and is also used as the power on-off switch. Clockwise rotation of the control knob from the OFF position applies primary power to the equipment and places the RT-11A in the receive condition. (The RT-11A is placed in the transmit condition when the microphone switch is closed.) Further clockwise rotation increases the audio level of the receiver.

3–2. OPERATION.

Step 1. Apply primary power to the Type 210 by rotating the VOL-OFF control clockwise. Allow approximately 1 minute for the RT-11A to warm up.

Step 2. Set the SCS-DCS switch to the desired mode of operation. (For a discussion of SCS-DCS operation, refer to paragraph 3–3.)

Step 3. Select the channel frequency by rotating the megacycle channel selector switch to the desired megacycle value. Then rotate the fractional megacycle channel selector switch to the desired fractional megacycle value.

Note

If the DCS mode of operation is used, the dial will indicate the frequency to which the receiver is tuned. The transmitter will automatically operate 6.0 mc above the indicated receiver frequency.

Step 4. Adjust the VOL control to the desired receiver audio output level.

Step 5. To transmit, close the microphone switch, and speak directly into the microphone. (The transmission will be monitored through rectification of the carrier in the sidetone circuit.)

Step 6. To receive, open the microphone switch.

3–3. SCS-DCS OPERATION.

The SCS-DCS switch on the C-67A Control Unit selects the mode of operation. When the SCS-DCS switch is in the SCS (single-channel simplex) position, the RT-11A Receiver-Transmitter receives and transmits on the frequency indicated on the channel frequency dial. When the SCS-DCS switch is in the DCS (double-channel simplex) position, the RT-11A receives on the frequency indicated on the channel frequency dial and transmits on a frequency 6.0 mc above the receiving frequency. For example: With the channel frequency dial indicating 120.70 mc and the SCS-DCS switch set to DCS position, the receiver will receive on 120.70 mc and the transmitter will transmit on 126.70 mc.

A single frequency, 126.70 mc, is used for en route flight check-point communications on the civil airways. Since check-point communications are usually relatively long conversations and since high-flying aircraft can have air-to-air interference as far as 600 miles apart, considerable interference has been experienced by pilots communicating with check-point stations.

The DCS system has been introduced by the CAA to alleviate the air-to-air interference problem. In the DCS system, ground check-point stations transmit on 120.70 mc and receive on 126.70 mc. The DCS feature can be used in many other instances to increase the reliability and maximum utility of aircraft communications.

TP1050

Figure 3–1. ARC Type C-67A Control Unit, Operating Controls

SECTION IV
PRINCIPLES OF OPERATION

Note

Modifications of the RT-11A Receiver-Transmitter are identified by an "M" number stamped on the bottom of the main chassis. The information contained in this section is applicable to all models, unless noted otherwise.

4–1. INTRODUCTION.

This section contains information covering the principles of operation of the ARC Type 210 VHF Communication Equipment. The crystal saving circuit, the channel selection circuit, and the channel tuning mechanism, which are common to the receiver and transmitter assemblies of the RT-11A, are discussed, followed by detailed circuit descriptions of all units.

The relationship of the RT-11A Receiver-Transmitter, the C-67A Control Unit, and the P-15A Power Unit is shown in the system block diagram, Figure 4–1. The RT-11A is the major unit of the Type 210 since it contains the receiver, transmitter, and modulator assemblies. The C-67A Control Unit provides the means for applying primary power, selecting the desired channel and mode of operation, and adjusting the audio output of the receiver assembly. The P-15A Power Unit is a double-commutator dynamotor designed to operate from the aircraft's 14-volt or 28-volt dc supply and furnish −120 volts dc and +340 volts dc to the RT-11A.

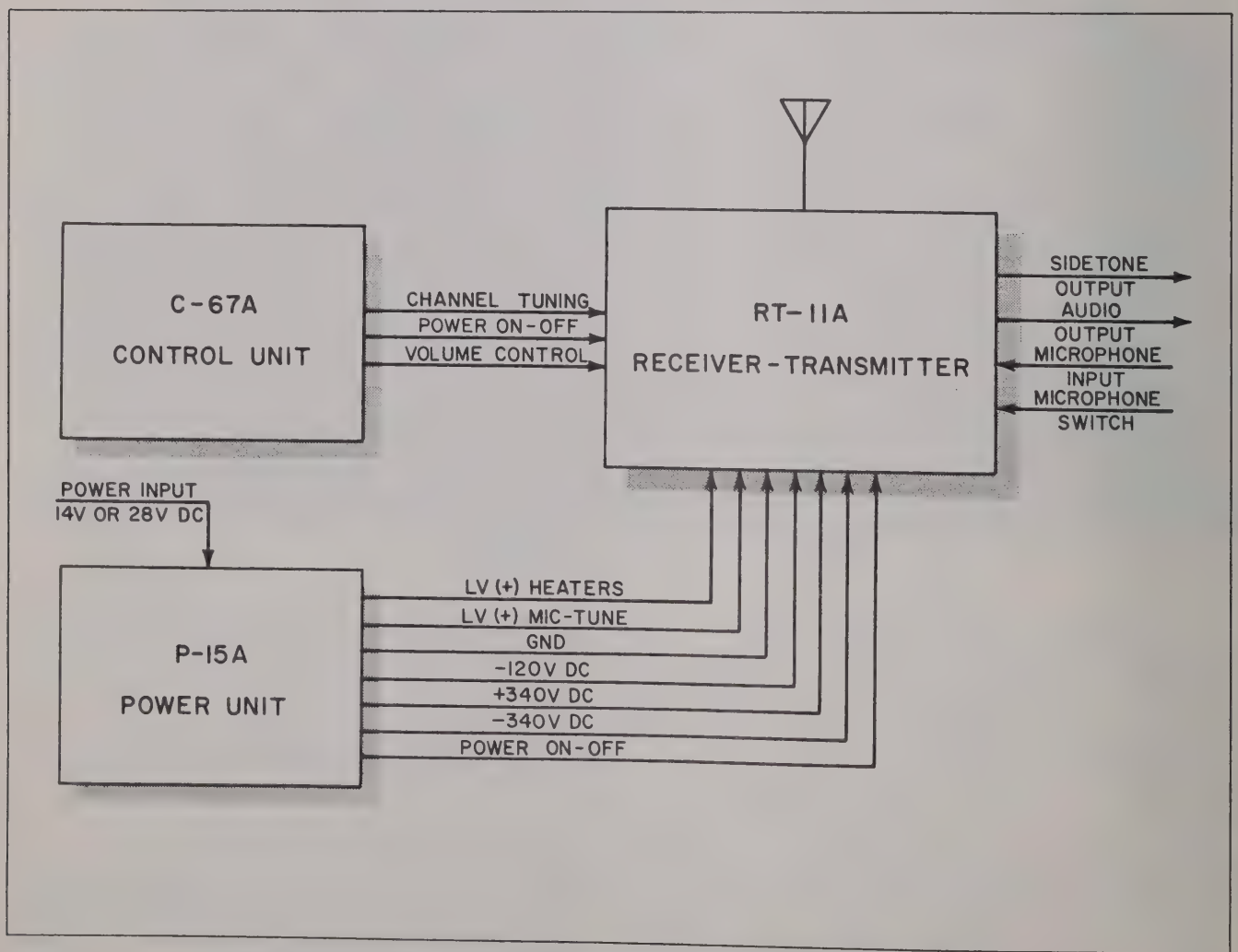


Figure 4–1. ARC Type 210 VHF Communication Equipment, Block Diagram

TP1159

4–2. CRYSTAL-SAVING CIRCUIT.

The crystal-saving circuit used in the RT-11A employs only 56 subminiature crystals for the 360 channels available. These crystals are divided into three groups contained in three servo-controlled crystal drums. Since the transmitter and receiver always operate on the same fraction of a megacycle, a single drum containing 20 crystals and a single crystal oscillator, designated the "fractional megacycle oscillator," are used to provide this function. In order to accomplish SCS-DCS operation (paragraph 3–3), separate drums, containing 18 crystals each, are used with separate crystal oscillators in the transmitter and receiver. The oscillators generate the whole megacycle portion of the signal required and are designated as the "transmitter megacycle crystal oscillator" and the "receiver megacycle crystal oscillator." The fractional megacycle crystals cover the frequency range of 10.00-10.95 mc in 0.05-mc steps. The transmitter and receiver megacycle crystals cover the frequency ranges of 54.00-62.50 mc and 53.15-61.65 mc in 0.5-mc steps, respectively.

For an example of the combination of crystal oscillator outputs (frequency synthesis) to produce a desired RT-11A frequency, assume that SCS operation of 120.10 mc has been selected at the C-67A Control Unit. To receive 120.10-mc signals, the required i-f frequencies are produced as follows (see Figure 4–5): The receiver megacycle oscillator derives its frequency (in this case 54.15 mc) from a crystal on the receiver megacycle crystal drum corresponding to the whole megacycle frequency (120 mc) selected at the control unit. The crystal frequency is doubled to 108.30 mc, the first mixer injection frequency. The received signal, 120.10 minus 108.30, produces the first i-f signal of 11.80 mc. The fractional megacycle oscillator derives its frequency (in this case 10.10 mc) from a crystal on the fractional megacycle crystal drum corresponding to the fractional megacycle frequency (0.10 mc) selected at the control unit. The fractional megacycle oscillator signal is coupled to the second mixer to serve as its injection frequency. The first i-f signal, 11.80 mc minus 10.10 mc, produces the second fixed i-f signal of 1.70 mc which is then amplified and detected in the conventional manner.

To transmit on 120.10 mc, the output frequency is produced as follows (see Figure 4–11): The transmitter megacycle oscillator derives its frequency (in this case 55.00 mc) from a crystal on the transmitter megacycle crystal drum corresponding to the whole megacycle frequency (120 mc) selected at the control unit. The crystal frequency is doubled to 110 mc and mixed with the fractional megacycle oscillator frequency (in this case 10.10 mc) to produce the desired transmitting frequency of 120.10 mc.

For DCS operation, the transmitter megacycle crystal drum is displaced by 6.0 mc in a higher-frequency direction from normal SCS operation. Under these conditions, the C-67A Control Unit indicates the frequency of the receiving channel only.

4–3. CHANNEL SELECTION.

Selection of any one of the 360 channels in the RT-11A Receiver-Transmitter is made at the C-67A Control Unit by means of 15 interconnecting wires divided into three 5-wire, open-seeking, binary re-entrant switching circuits. There are two channel selector switches in the C-67A: the megacycle channel selector switch, and the fractional megacycle channel selector switch. The megacycle channel selector switch simultaneously controls the positioning of both the transmitter megacycle and receiver megacycle crystal drums in the RT-11A. The fractional megacycle channel selector switch controls the positioning of the fractional megacycle crystal drum.

A functional diagram of the RT-11A channel selecting mechanism is shown in Figure 4–2. A small motor is used to drive all three crystal drums and their associated linkages. The crystal drums are pawl-and-ratchet rotated by means of cams driven by the motor through reduction gears. Under static conditions, the pawls are locked in their home position by unenergized latching relays. When a new channel is selected, the latching relays on the crystal drums affected are energized. The relay contacts energize the motor circuit which rotates the drive cam against the pawl drive lever, releasing the spring-loaded latching lever. The released pawl drive levers rest against the motor driven cams which drive the crystal drums through the pawls until the desired crystal frequency on each drum is reached, at which time, the relay circuit is opened and the pawl drive levers are locked in the home position. In the locked position, a round indexing pin on the index lock arm assembly slides into a square notch on the index plate accurately locking the drum in the selected position. The motor continues to run until all the pawl drive levers are latched.

Due to the space allotted for the crystal drums and the mechanical requirements of the selector switch in the C-67A, all three crystal drums are identical in size. The fractional megacycle crystal drum requires space for 20 crystals; therefore, a 20-position drum is used for the receiver and transmitter megacycle crystal drums, although space for only 18 crystals is required for these drums. The two vacant crystal positions on each megacycle drum provide space for the return angle of the tuning plate cam follower. Since all 20 crystal positions are used in the fractional megacycle crystal drum, a heart-shaped tuning cam is used for fractional megacycle tuning. To provide correct alignment for this cam, the 0.10-mc crystals are arranged in order of ascending frequency for

drum positions 1 through 10, and the 0.05-mc crystals are arranged in descending order for positions 10 through 20.

The switching functions for the two master selector switches in the C-67A Control Unit are as follows: The 20-position fractional megacycle channel selector switch selects the alternately placed crystals on the fractional megacycle crystal drum in the correct frequency sequence. The 18-position megacycle channel selector switch simultaneously selects one of 18 crystals on both the 20-position transmitter and receiver megacycle crystal drums, without stopping on the two blank spaces on either drum. The binary code employed to meet these switching requirements uses five control wires per drum. Figure 4–3 is a simplified schematic diagram of the binary switching code used for the 20-position drums, the 20-position fractional megacycle selector switch, and the 18-position megacycle selector switch. The code can be described as two re-entrant ten-digit codes which are also re-entrant with each other to form a twenty-digit code, with the further characteristic that two digits can be removed and re-entrance maintained. Selection of single- or double-channel simplex operation is accomplished by connecting the five control wires of the transmitter megacycle crystal drum to one of two sets of wipers on the megacycle channel selector switch.

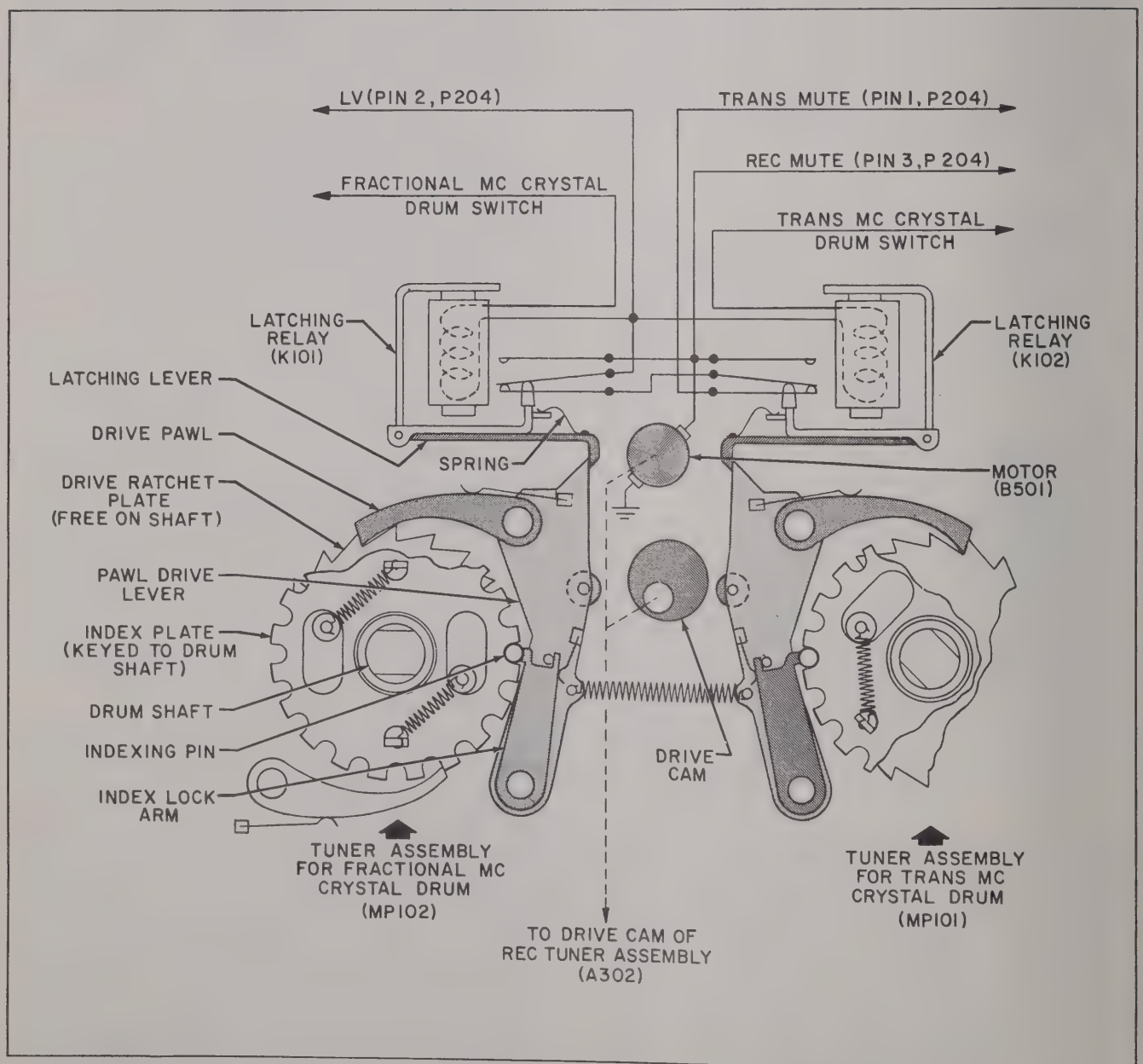

LV(PIN 2, P204)
TRANS MUTE (PIN 1, P204)
REC MUTE (PIN 3, P 204)
FRACTIONAL MC CRYSTAL DRUM SWITCH
TRANS MC CRYSTAL DRUM SWITCH
LATCHING RELAY (K101)
LATCHING RELAY (K102)
LATCHING LEVER
DRIVE PAWL
SPRING
MOTOR (B501)
DRIVE RATCHET PLATE (FREE ON SHAFT)
PAWL DRIVE LEVER
INDEX PLATE (KEYED TO DRUM SHAFT)
DRUM SHAFT
INDEXING PIN
INDEX LOCK ARM
DRIVE CAM
TUNER ASSEMBLY FOR FRACTIONAL MC CRYSTAL DRUM (MP102)
TUNER ASSEMBLY FOR TRANS MC CRYSTAL DRUM (MP101)
TO DRIVE CAM OF REC TUNER ASSEMBLY (A302)

Figure 4–2. Transmitter Tuner Assembly, Functional Diagram TP1293

4–4. CHANNEL TUNING.

Transmitter Channel Tuning. The main, or megacycle, tuning of the transmitter assembly is accomplished by variable, air-dielectric, butterfly-type capacitors. Fractional megacycle tuning is accomplished by inductance trimming. The r-f sections of the transmitter assembly are divided into compartments, each compartment having one variable capacitor. A functional diagram of the transmitter megacycle tuning mechanism, which is also applicable to the receiver tuning, is shown in Figure 4–4. A tuning arm assembly is mounted on the rotor shaft of each variable capacitor. Mounted at the end of each tuning arm assembly is a miniature ball bearing whose axis of rotation is parallel to the rotor shaft. Each ball bearing is spring loaded against a straight surface of a tuning plate. The straight surface is perpendicular to the direction of travel of the tuning plate, which is positioned by a cam mounted directly on the shaft of the transmitter megacycle crystal drum. The length of each tuning arm assembly is adjustable, so that for a fixed displacement of the tuning plate, the angle of rotation of each capacitor shaft is independently adjustable. Minimum capacitance is adjusted by rotating the capacitor shaft with respect to its tuning arm.

The two adjustments of angular rotation and minimum capacitance are completely independent and permit accurate tracking of the tuned circuits. Only one adjustment is required at each end of the frequency band. With the tuning plate in its highest frequency position (135.00 mc), minimum capacitance for each tuning capacitor is adjusted by loosening the setscrew which fastens the tuning arm to the capacitor rotor shaft, rotating the shaft to the desired minimum value, and then tightening the setscrew. In this position, the line of angular rotation adjustment is perpendicular to the line of motion of the tuning plate; therefore, the length of the tuning arm has no effect on the minimum-capacitance adjustment. With the tuning plate in its lowest frequency position (118.00 mc), the required angular rotation for each tuning capacitor is adjusted by the tuning arm screw which varies the effective length of the tuning arm assembly.

Fractional megacycle tuning of the transmitter is accomplished by slug-tuning the plate circuit of the fractional megacycle oscillator-balanced mixer, V102, and the grid circuit of the push-pull power amplifier, V106. A cam mounted on the shaft of the fractional megacycle crystal drum is used to control axial movement of eddy current slugs into the respective tank circuits.

Receiver Channel Tuning. The main, or megacycle, tuning of the receiver assembly is similar in principle to that used in the transmitter (see Figure 4–4). Variable, air-dielectric, butterfly-type capacitors, each mounted in a separate compartment and mechanically tracked by a tuning plate, are used to tune the r-f amplifier, megacycle crystal oscillator, and doubler circuits. The tuning plate is positioned by a cam mounted directly on the shaft of the receiver megacycle crystal drum. Fractional megacycle tuning of the receiver is accomplished by slug-tuning the double-tuned first i-f filter over the frequency range of 11.7 to 12.65 megacycles. The ferrite cores, which tune the two coils in the first i-f filter, are cam-driven by a shaft which is geared to the fractional megacycle crystal drum (located on the transmitter assembly). The second i-f amplifier section includes four double-tuned, i-f transformers which are pretuned to 1.7 megacycles and hermetically sealed.

4–5. RT-11A RECEIVER-TRANSMITTER.

Receiver Assembly. As shown in Figure 4–5, the receiver assembly employs a double-conversion, crystal-controlled, superheterodyne circuit, using 11 subminiature electron tubes. During reception, r-f signals between 118.00 and 135.95 megacycles are picked up by the antenna and fed to the receiver input through the normally closed contacts of antenna relay K201. The r-f signals are amplified by the double-tuned cascode r-f amplifier, V301 and V302, and fed to the first mixer, V303. The output of the receiver megacycle crystal oscillator-doubler (106.3-123.3 mc), V309, is also fed to the first mixer, where the r-f and oscillator-doubler signals beat to produce a first i-f signal of 11.70-12.65 mc. The resultant signal is connected to a double-tuned first i-f filter, tunable from 11.70-12.65 mc, which passes the first i-f signal to the second mixer, V304. At the second mixer, the variable first i-f signal is mixed with the output (10.00-10.95 mc) of the transmitter fractional megacycle cathode follower, V103, to produce a second i-f signal of 1.7 mc. The fixed second i-f signal is amplified by three stages of double-tuned amplification, V305, V306, and V307, and coupled to the detector-agc tube, V308, where the signal is demodulated. The audio output of the detector is coupled to the first audio amplifier, one-half of V311, through an automatic noise limiter and a squelch circuit. The audio output of V311 is further amplified by the a-f power amplifier, V310, and connected to the low-impedance headset (TEL) line through a 3000:300-ohm step-down transformer. During transmission periods, the a-f power amplifier is also used as an amplifier for the sidetone signal which is obtained by rectifying a small portion of the transmitter r-f output. The functioning of the individual circuits of the receiver assembly is described in the following paragraphs.

C-67A CONTROL UNIT SWITCHING SEQUENCE FOR SELECTOR SWITCHES

MEGACYCLE SEL. SWITCH		FRACT. MC SEL. SWITCH	CONTROL WIRE NO. (NOTE 3)				
REC.	TRANS.	FRACT.	1	2	3	4	5
118	135	.45	—	⏚	—	⏚	⏚
119	134	.35	⏚	—	⏚	⏚	⏚
120	133	.25	—	⏚	⏚	⏚	⏚
121	132	.15	⏚	⏚	⏚	⏚	—
122	131	.05	⏚	⏚	⏚	—	—
123	130	.00	⏚	⏚	—	—	—
124	129	.10	⏚	—	—	—	⏚
125	128	.20	—	—	—	⏚	—
126	127	.30	—	—	⏚	—	—
127	126	.40	—	⏚	—	—	—
128	125	.50	⏚	—	—	—	—
129	124	.60	—	—	—	—	⏚
130	123	.70	—	—	—	⏚	⏚
131	122	.80	—	—	⏚	⏚	—
132	121	.90	—	⏚	⏚	—	—
133	120	.95	⏚	⏚	—	—	⏚
134	119	.85	⏚	—	—	⏚	—
135	118	.75	—	—	⏚	—	⏚
		.65	—	⏚	—	⏚	—
		.55	⏚	—	⏚	—	⏚

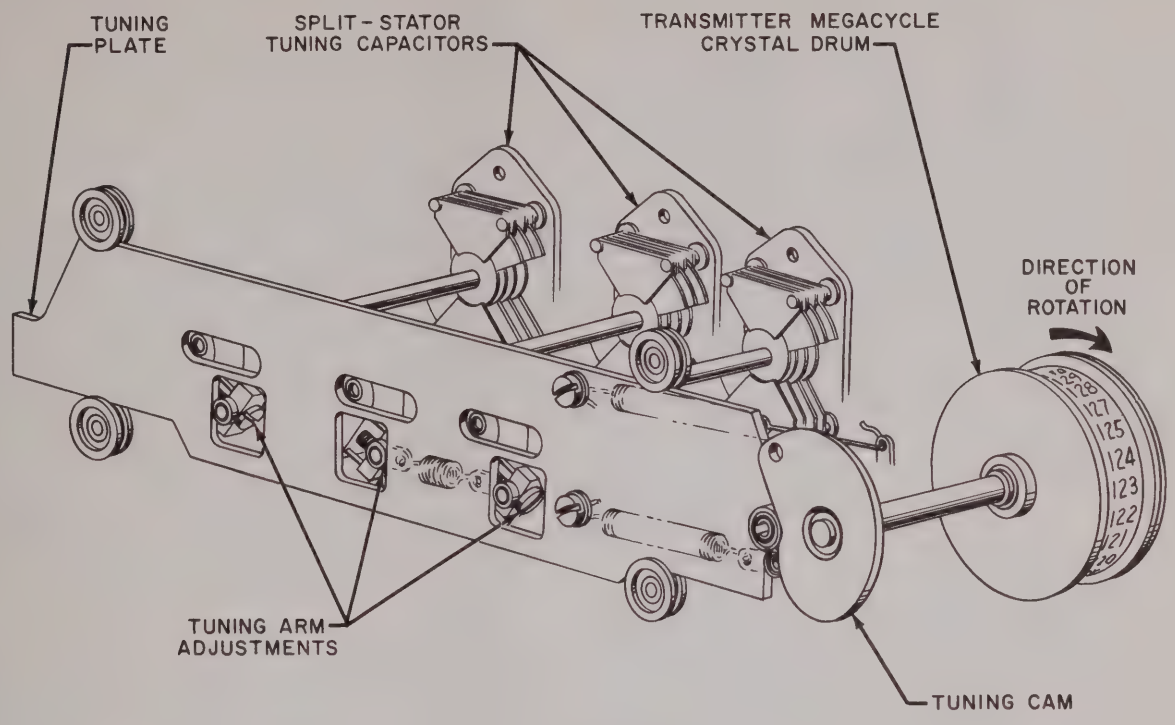
RT-11A RECEIVER-TRANSMITTER SWITCHING SEQUENCE FOR CRYSTAL DRUMS

CRYSTAL DRUM POSITION			CONTROL WIRE NO. (NOTE 3)				
REC.	TRANS.	FRACT.	1	2	3	4	5
118	135	.45	—	⏚	—	⏚	⏚
119	134	.35	⏚	—	⏚	⏚	⏚
120	133	.25	—	⏚	⏚	⏚	⏚
121	132	.15	⏚	⏚	⏚	⏚	—
122	131	.05	⏚	⏚	⏚	—	—
123	130	.00	⏚	⏚	—	—	—
124	129	.10	⏚	—	—	—	⏚
125	128	.20	—	—	—	⏚	—
126	127	.30	—	—	⏚	—	—
127	126	.40	—	⏚	—	—	—
128	125	.50	⏚	—	—	—	—
129	124	.60	—	—	—	—	⏚
130	123	.70	—	—	—	⏚	⏚
131	122	.80	—	—	⏚	⏚	—
132	121	.90	—	⏚	⏚	—	—
133	120	.95	⏚	⏚	—	—	⏚
134	119	.85	⏚	—	—	⏚	—
135	118	.75	—	—	⏚	—	⏚
X	X	.65	—	⏚	—	⏚	—
X	X	.55	⏚	—	⏚	—	⏚

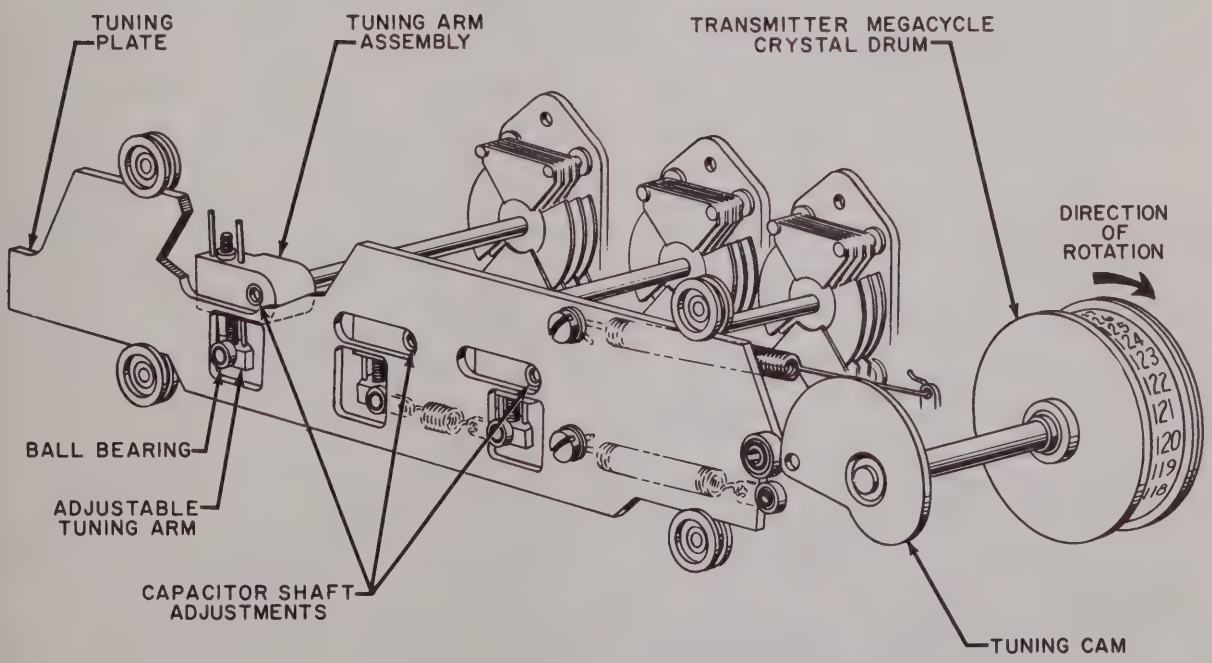
NOTES:
1. ⏚ INDICATES GROUND.
2. — INDICATES WIRES NOT GROUNDED BUT CONNECTED TOGETHER.
3. WIRE NUMBERS REFER TO RECEIVER, TRANSMITTER, OR FRACTIONAL MEGACYCLE CONTROL WIRE GROUP FOR RELATED SWITCH POSITION (SEE FIGURE 6-1 OR 6-19).
4. X INDICATES A BLANK POSITION ON THE CRYSTAL DRUM.

Figure 4–3. Binary Code Switching Sequence, Simplified Schematic Diagram

TP1295



118-MC POSITION



135-MC POSITION

TP1297

Figure 4–4. Transmitter Megacycle Tuning Mechanism, 118- and 135-Megacycle Positions, Functional Diagram

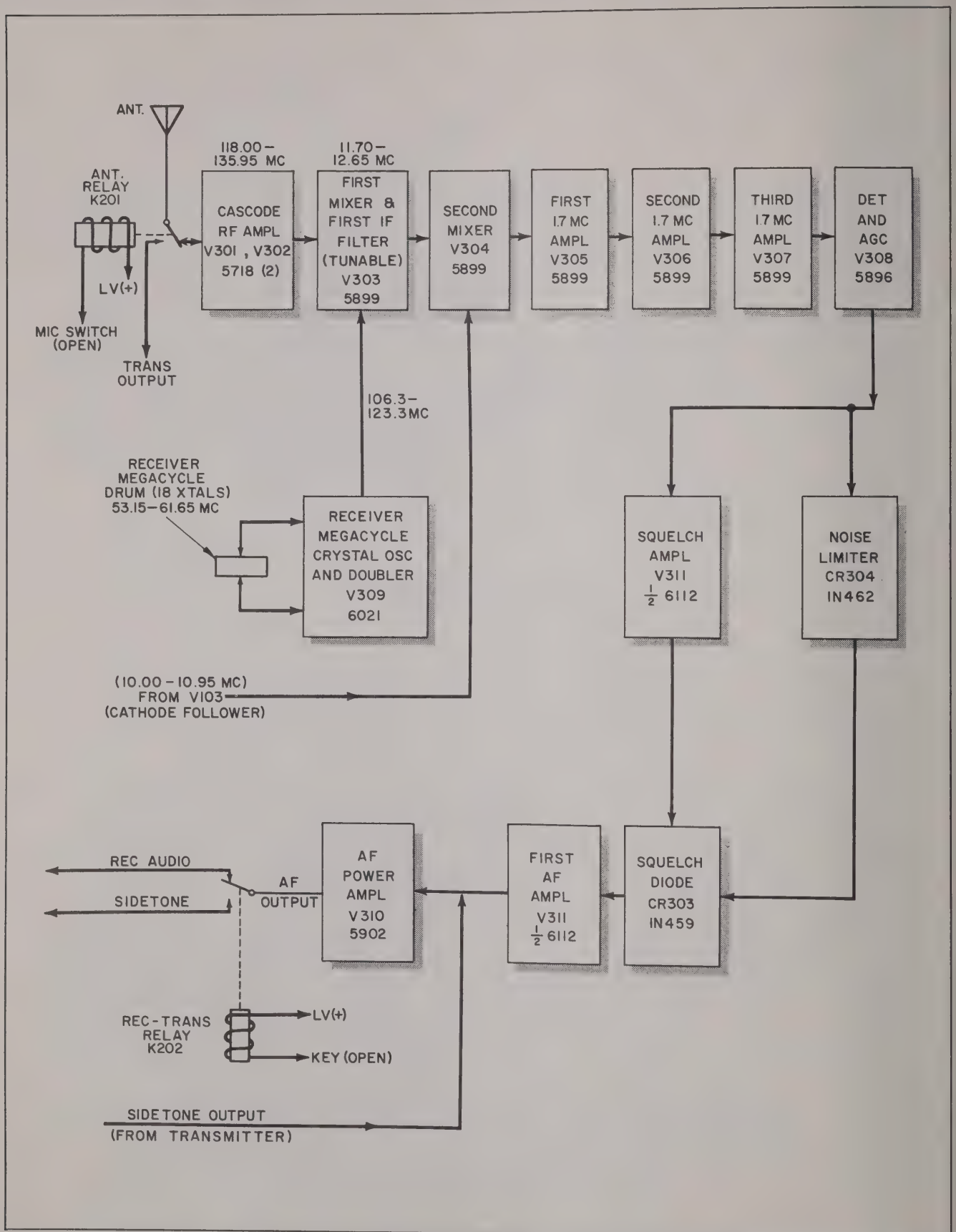

ANT.
ANT. RELAY K201
LV(+)
MIC SWITCH (OPEN)
TRANS OUTPUT
118.00 – 135.95 MC
CASCODE RF AMPL V301, V302 5718 (2)
11.70 – 12.65 MC
FIRST MIXER & FIRST IF FILTER (TUNABLE) V303 5899
SECOND MIXER V304 5899
FIRST 1.7 MC AMPL V305 5899
SECOND 1.7 MC AMPL V306 5899
THIRD 1.7 MC AMPL V307 5899
DET AND AGC V308 5896
106.3 – 123.3 MC
RECEIVER MEGACYCLE DRUM (18 XTALS) 53.15 – 61.65 MC
RECEIVER MEGACYCLE CRYSTAL OSC AND DOUBLER V309 6021
SQUELCH AMPL V311 ½ 6112
NOISE LIMITER CR304 IN462
(10.00 – 10.95 MC) FROM V103 (CATHODE FOLLOWER)
REC AUDIO
SIDETONE
AF OUTPUT
AF POWER AMPL V310 5902
FIRST AF AMPL V311 ½ 6112
SQUELCH DIODE CR303 IN459
REC-TRANS RELAY K202
LV(+)
KEY (OPEN)
SIDETONE OUTPUT (FROM TRANSMITTER)

Figure 4–5. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Block Diagram

TP1161

CASCODE RF AMPLIFIER. As shown in Figure 4–6, the r-f amplifier is a series d-c coupled cascode circuit using two 5718 triode tubes, V301 and V302. The cascode circuit, which provides the high input circuit gain of a pentode and the low-noise characteristics of a triode, employs one tuned circuit in the amplifier input and a double-tuned circuit between the amplifier output and the input to the first mixer, V303. Both tuned circuits are geared to the main, or megacycle, tuning plate which is driven by a cam on the receiver megacycle crystal drum. When one of the 360 receiving frequencies is selected by switch action at the C-67A Control Unit, the receiver megacycle tuning mechanism is indexed to the correct position for tuning the desired frequency. The signal received by the antenna is coupled to the r-f amplifier through the normally closed contacts of K201 by means of a low-impedance tap on L301. The r-f signal is amplified by V301 and V302 and fed to the grid of the first mixer, V303, through the double-tuned circuit which passes the desired signal frequency.

The tuned input circuit, consisting of L301, tuning capacitor C302, and trimmer capacitor C303, is coupled to the grid of V301 through C304. Agc voltage is applied to the grid through decoupling resistor R301. C301 functions as the r-f bypass connector for the agc line. R302 provides bias for V301. The plate of V301 is d-c coupled to the cathode of V302 by L302 which resonates the cathode-to-ground capacitance of V302. Fixed bias is furnished to V302 by a voltage divider consisting of R304 and R305. C306 effectively grounds the grid of V302 for r-f. C312 is an r-f bypass capacitor for the +220-volt dc supply lead. The plate of V302 is coupled to its tank circuit through parasitic suppressor resistor R303. The plate tank circuit, which is the first section of the double-tuned circuit, consists of tuning capacitor C305A, trimmer capacitor C308A, and L303. C309 couples the output of the plate tank circuit to the second section of the double-tuned circuit consisting of tuning capacitor C305B, trimmer capacitor C308B, and L304. C311 couples the output of the double-tuned circuit to the grid of the first mixer.

RECEIVER MEGACYCLE CRYSTAL OSCILLATOR-DOUBLER. The receiver megacycle crystal oscillator-doubler uses a 6021 twin triode, V309, in a Butler cathode-coupled, series-mode, crystal oscillator-doubler circuit (see Figure 4–6). The function of this stage is to generate the megacycle r-f injection signal for the first mixer, V303. Depending upon the setting of the megacycle channel selector switch in the C-67A Control Unit, one of eighteen subminiature crystals mounted on the receiver megacycle crystal drum is connected between the cathodes of V309. (Each crystal is designed to operate at series resonance on the third overtone mode.) The first triode, V309A, is connected as a grounded-grid amplifier; the second triode, V309B, is connected as a split-load cathode follower and frequency doubler.

The Butler oscillator operates as follows: L309, tuning capacitor C350A, and trimmer capacitor C351 form a tank circuit which is coupled to the plate of V309A by C352. The tank circuit is tuned to the resonant frequency of the crystal (53.15-61.61 mc). Oscillations appearing at the plate of V309A are coupled to the grid of V309B through C353. The oscillator crystal, Y301-Y318, oscillating in the series-resonant mode, acts as a low-value pure resistance at its resonant frequency and transmits the voltage appearing at the cathode of V309B to the cathode of V309A. In turn, V309A, connected as a grounded-grid amplifier, reinforces the oscillations at its plate. Thus, the positive feedback necessary to sustain oscillation is obtained, but only at the frequency at which the crystal is resonant.

Frequency doubling is accomplished by tuning the plate circuit of V309B to the second harmonic (106.3-123.3 mc) of the oscillator. L312, tuning capacitor C350B, and trimmer capacitor C357 comprise the doubler tank circuit which is connected to the plate of V309B by C356. The output of the doubler circuit, taken from a low-impedance tap on L312, is coupled to the cathode of the first mixer, V303, by C315.

R343 and R342 are the cathode load resistors for V309A and V309B, respectively. A series network consisting of L311 and C354 is connected in parallel with the crystal (Y301-Y318). L311 resonates with the crystal shunt capacitance to insure that the crystal acts as a pure resistance at its resonant frequency. C354 is used as a d-c blocking capacitor. R338 suppresses parasitic oscillations. R339 is the shunt-feed plate resistor for V309A and C310 is the r-f bypass capacitor for the +150-volt dc supply lead. The plate circuit of V309B is decoupled from the +150-volt supply voltage by R340 and C355. L310 is the shunt-feed plate choke for V309B. R341 and R342 provide grid bias for V309B.

FIRST MIXER. The first mixer employs a 5899 pentode (see Figure 4–7). The r-f signal output (118.00-135.95 mc) of the cascode r-f amplifier, V301 and V302, is coupled to the grid of the first mixer, V303, by C311. The injection frequency (106.3-123.3 mc) provided by the receiver megacycle crystal oscillator-doubler, V309, is coupled to the cathode of the first mixer by C315. The injection frequency beats in the mixer with the received signal frequency to produce a first i-f frequency which is variable from 11.70 to 12.65 mc. The output of the first mixer is connected to a double-tuned first i-f filter which passes the first i-f signal. Agc voltage is applied to the grid circuit of the mixer through R306. The output of V303 is coupled to the first i-f filter through parasitic suppressor resistor R308.

FIRST I-F FILTER. The first i-f filter (see Figure 4–7) is a double-tuned circuit connected between the first mixer, V303, and the second mixer, V304. The function of the filter is to provide bandpass fractional megacycle tuning of the first i-f signal. Tuning of the filter is accomplished by slug-tuning the two tuned circuits over the frequency range of 11.70-12.65 mc. The tuning slug shaft is driven by a cam which is geared to the fractional megacycle crystal drum located on the transmitter assembly.

The first section of the i-f filter is the plate tank circuit of the first mixer, V303, and consists of C314, C316, C319, R310, and L305. R310 is connected in shunt with the circuit to broaden the pass band. Plate voltage for V303 is applied through decoupling resistor R311. Capacitors C307, C318, and C317 are r-f bypass capacitors. The first section of the filter is coupled to the second section by C320. The second section of the i-f filter is similar to the first section and consists of L306, R312, C321, C322, and C324.

SECOND MIXER. The second mixer, V304, is a 5899 pentode (see Figure 4–7). The output of the first i-f filter (11.70-12.65 mc) is coupled directly to the grid of V304. The second mixer injection frequency (10.00-10.95 mc), obtained from the transmitter fractional megacycle cathode follower, V103, is coupled to the cathode of V304 by C323. The first i-f signal beats with the injection frequency to produce the second i-f signal of 1.7 megacycles. The output of the second mixer is coupled to the first 1.7-mc amplifier, V305, by a double-tuned 1.7-mc i-f transformer, T301, which is pretuned and hermetically sealed.

The second section of the first i-f filter forms the grid tank circuit for the second mixer. The plate tank circuit consists of the tapped primary circuit of the 1.7-mc i-f transformer, T301. R315 is used to decouple the plate circuit from the +150-volt supply, and C326 is the r-f bypass capacitor for the i-f transformer primary.

1.7-MC AMPLIFIER STAGES. Three 5899 pentodes, V305, V306, and V307, are employed to amplify the 1.7-mc i-f signal (see Figure 4–8). With the exception of the grid circuit of V307, all amplifier stages are electrically identical.

In the first 1.7-mc amplifier, the 1.7-mc signal output of the second mixer, V304, is coupled to the grid of V305 by the double-tuned 1.7-mc i-f transformer, T301. The secondary of T301 forms the grid circuit for V305. The secondary is tapped for correct impedance matching to the grid; the low side of the secondary winding is connected to agc bias through the decoupling circuit consisting of R316 and C327. The plate tank circuit consists of the tapped primary circuit of the 1.7-mc i-f transformer, T302. R321 and C337 decouple the plate circuit from the +150-volt supply.

The second and third 1.7-mc amplifiers, V306 and V307, operate the same except that V307 is not under agc control. The grid of V307 is returned to ground through the secondary of T303, and self-bias is provided by R326. I-f transformer T304 couples the output of the three-stage 1.7-mc amplifier to the detector-agc tube, V308.

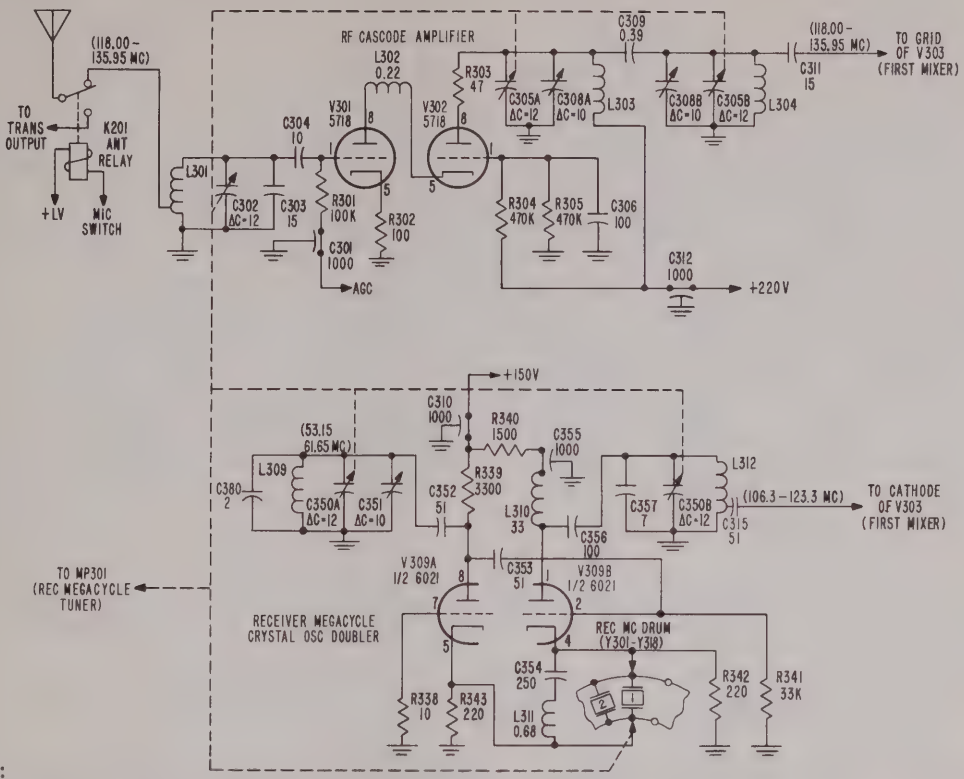
DETECTOR. In units stamped M-1 through M-7, the detector, V308A, is one half of a 5896 twin diode connected as a series rectifier (see Figure 4–9). The 1.7-mc second i-f signal from terminal 4 of transformer T304 is applied to the plate of V308A. The diode load consists of R329, R330, and R333 connected between terminal 3 of transformer T304 and the diode cathode. These resistors are bypassed for radio frequencies by C345, C346, and C348, respectively.

In units stamped M-8 or higher, the detector, V308A, is one half of a 5896 twin diode connected as a shunt rectifier (see Figure 4–9A). The 1.7-mc second i-f signal from terminal 4 of transformer T304 is coupled to the plate of V308A by C345. The diode load consists of R329, R330, and cathode resistor R333. R330 and R333 are bypassed for radio frequencies by C346 and C348, respectively.

In all units, the audio-frequency component of the rectified voltage is obtained from the junction of R329 and R330 and applied through CR304 (noise limiter diode), C366, CR303 (squelch diode), and C365 to the grid of the first a-f amplifier, V311A.

AUTOMATIC NOISE LIMITER. A type 1N462 silicon diode, CR304, is used as a series-valve noise limiter connected between the detector output and the squelch diode, CR303 (see Figure 4–9). The noise limiter circuit, designed to automatically open the audio amplifier circuit when a sharp pulse of noise is received, functions as follows: The negative voltage developed across the detector load resistors, R329 and R330, is applied through R331 to C347, building up on this capacitor a negative voltage approximately equal to the total average rectified d-c voltage across R329 and R330. The audio frequency path is from the junction of R329 and R330 to the anode of CR304, and then through C366, CR303, and C365 to the grid of V311A. The voltage at the cathode of CR304, which is connected through R332 to the junction of C347 and R331, is equal to the voltage of C347. This voltage is more negative than the anode voltage of CR304 because of the voltage divider action of R329 and R330. Since the cathode of diode CR304 is more negative than the anode, current flows through the diode and the audio frequency circuit is completed.

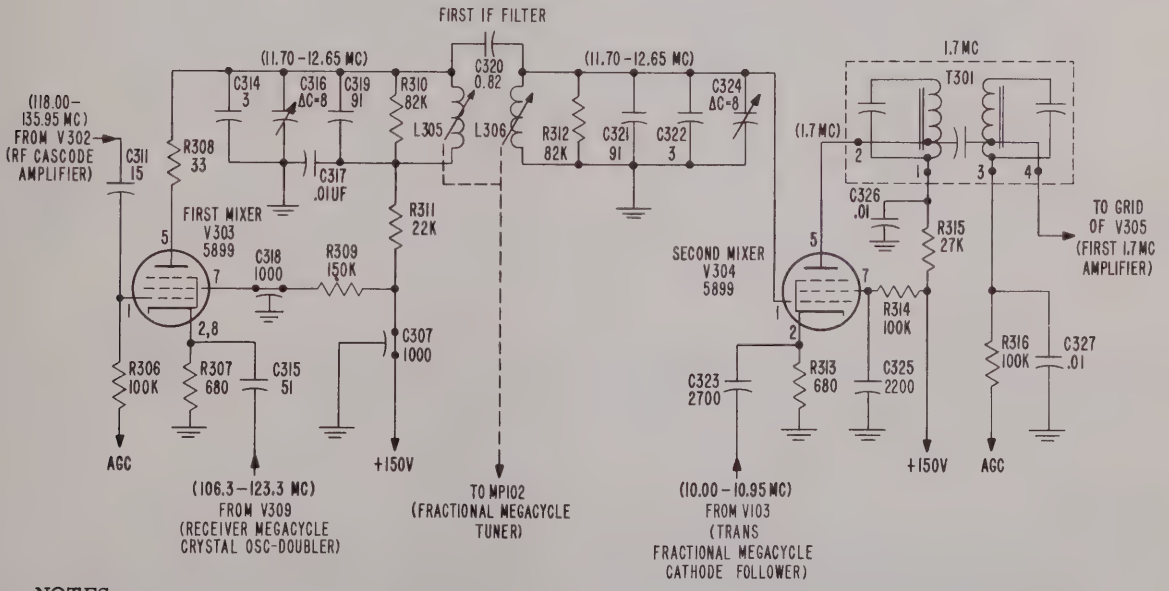
When a sharp pulse of noise is received, the long time constant of R331 and C347 does not permit a rapid



NOTES:
1. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F), UNLESS NOTED OTHERWISE.
2. RESISTANCE VALUES ARE IN OHMS. MULTIPLIER: K=1,000.
3. INDUCTANCE VALUES ARE IN MICROHENRIES (μH), UNLESS NOTED OTHERWISE.
4. SECTIONS OF TWIN TUBES ARE IDENTIFIED BY A AND B FOR REFERENCE PURPOSES.

TP1299A

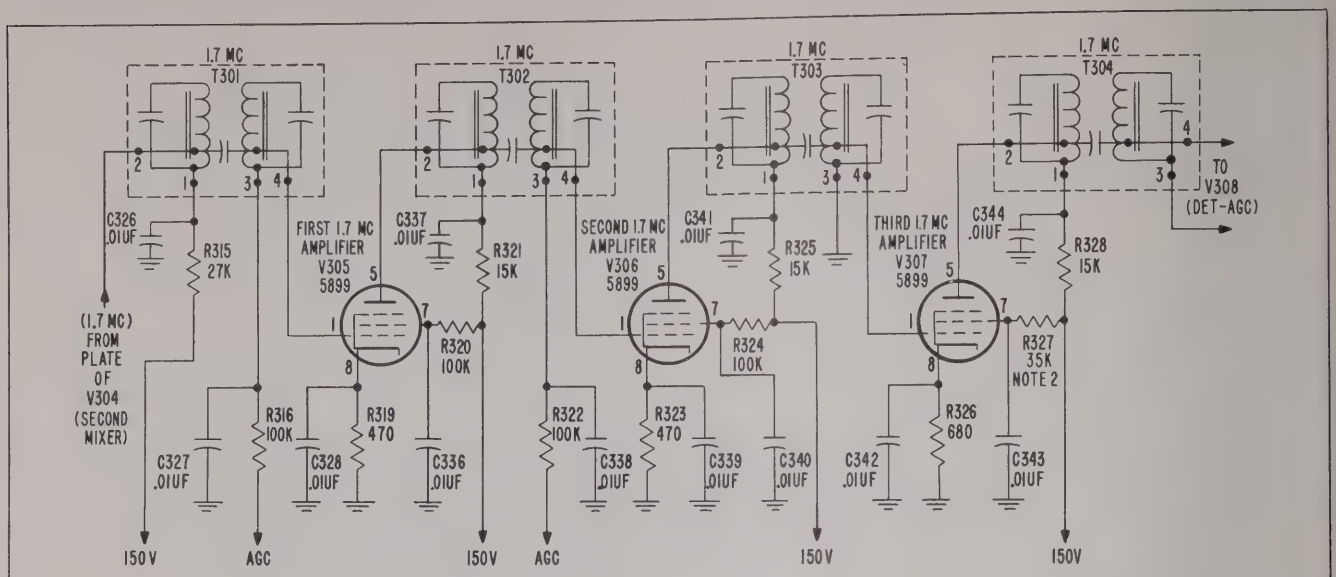
Figure 4–6. R-f Cascode Amplifier and Receiver Megacycle Crystal Oscillator-Doubler, Schematic Diagram



NOTES:
1. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F), UNLESS NOTED OTHERWISE.
2. RESISTANCE VALUES ARE IN OHMS. MULTIPLIER: K=1,000.

TP1301A

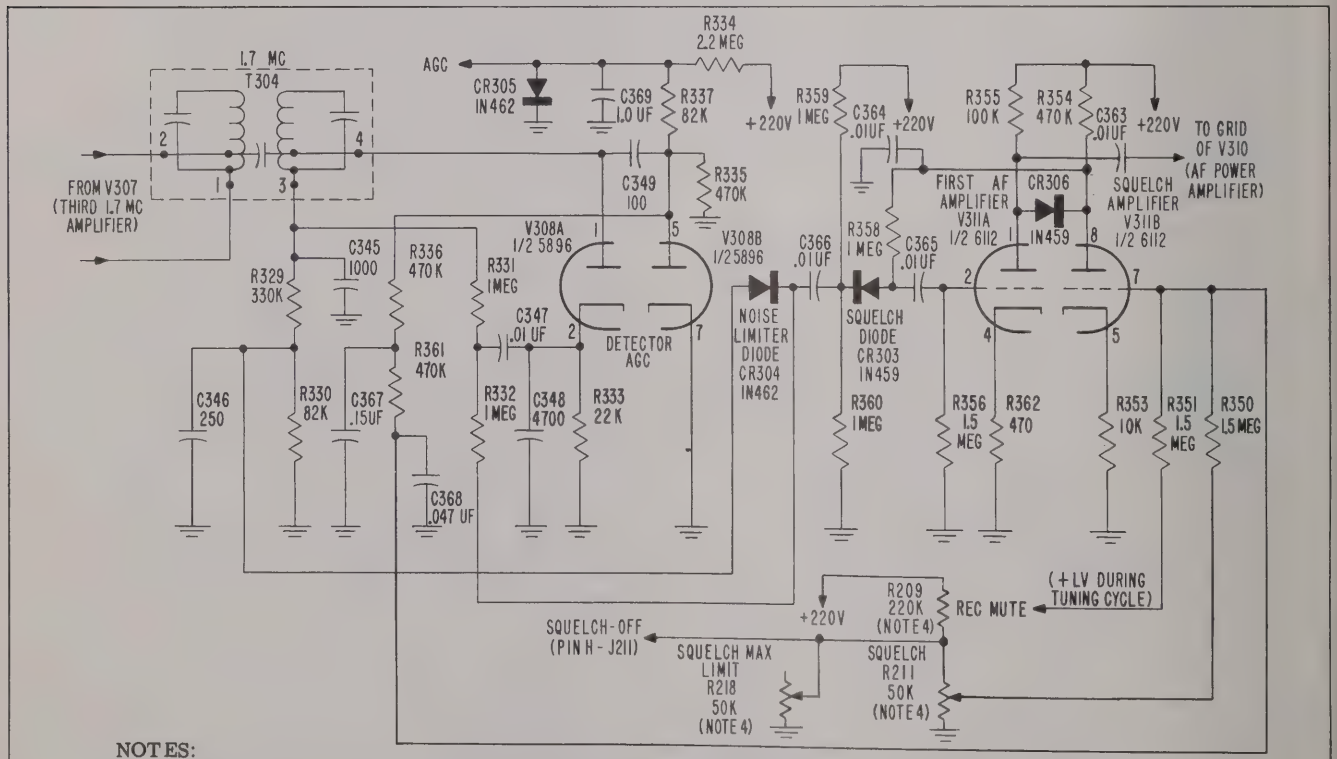
Figure 4–7. Mixers and First I-f Filter, Schematic Diagram



NOTES:
1. RESISTANCE VALUES ARE IN OHMS. MULTIPLIER K = 1000.
2. R327 WAS 100K IN M-1 THROUGH M-9 UNITS.

TP1303A

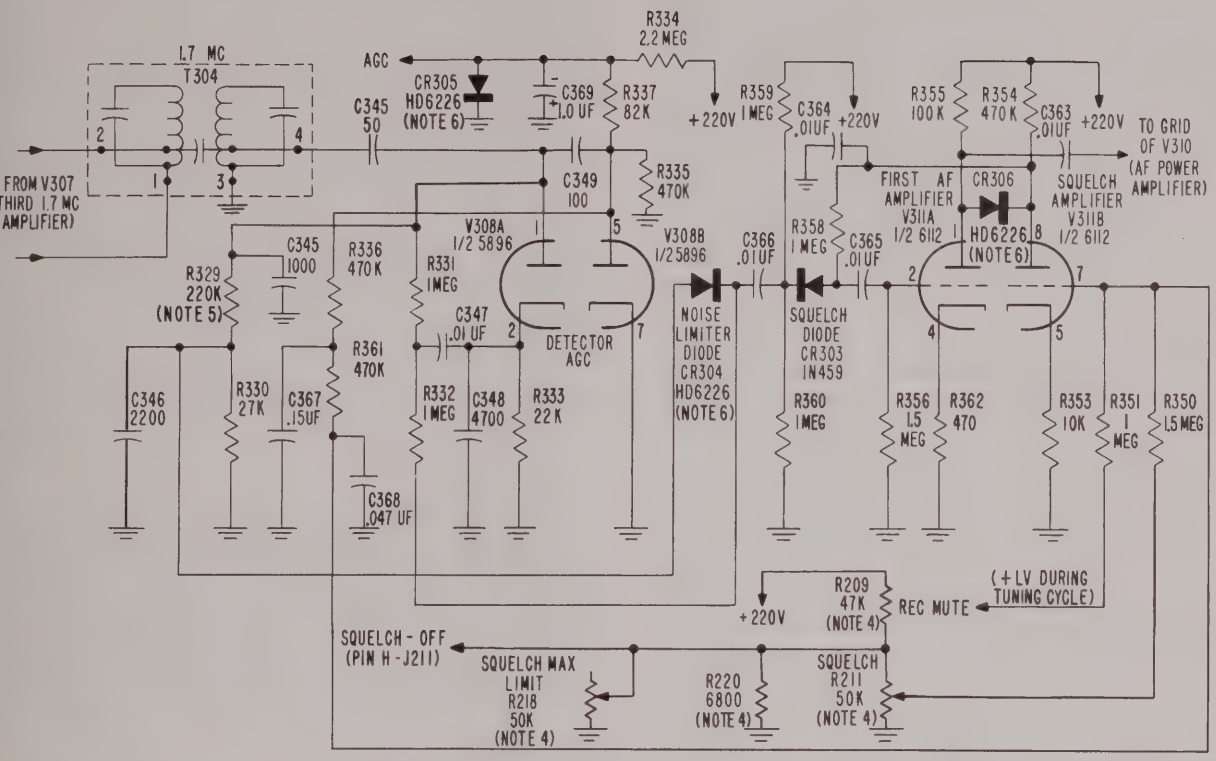
Figure 4–8. 1.7-mc Amplifiers, Schematic Diagram



NOTES:
1. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F) UNLESS NOTED OTHERWISE.
2. RESISTANCE VALUES ARE IN OHMS. MULTIPLIERS: K=1,000; MEG=1,000,000.
3. SECTIONS OF TWIN TUBES ARE IDENTIFIED BY A AND B FOR REFERENCE PURPOSES.
4. R209, R211, R218, AND R220 ARE LOCATED IN THE RT-11A CHASSIS ASSEMBLY (A201).
5. CR306 NOT USED IN M-1 THROUGH M-5 UNITS.
6. C367 WAS .047 μF IN M-1 THROUGH M-6 UNITS.

TP1305A

Figure 4–9. Detector-Agc, Noise Limiter, First A-f Amplifier and Squelch Amplifier, Schematic Diagram (M-1 through M-7 Units)



NOTES:

1. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F) UNLESS OTHERWISE NOTED.
2. RESISTANCE VALUES ARE IN OHMS. MULTIPLIERS: K = 1000; MEG = 1,000,000.
3. SECTIONS OF TWIN TUBES ARE IDENTIFIED BY A AND B FOR REFERENCE PURPOSES.
4. R209, R211, R218, AND R220 ARE LOCATED IN THE RT-11A CHASSIS ASSEMBLY (A201).
5. R329 WAS 330K IN M-1 THROUGH M-7 UNITS AND 150K IN M-8 AND M-9 UNITS.
6. CR304 AND CR305 WERE 1N462 AND CR306 WAS 1N459 IN M-1 THROUGH M-7 AND SOME M-8 UNITS.

TP1619A

Figure 4–9A. Detector-Agc, Noise Limiter, First A-f Amplifier, and Squelch Amplifier, Schematic Diagram (M-8 and Higher Units)

change in the cathode voltage of CR304. However, the voltage at the junction of R329 and R330 rapidly follows the change due to the noise pulse, and the anode of CR304 goes more negative than the cathode causing the a-f circuit to be opened for the duration of the noise pulse. R333 accelerates the diode cutoff condition by applying a positive pulse through C347 and R332 to the cathode of CR304. The a-f output of the noise limiter is coupled to the cathode of squelch diode CR303 by C366.

AUTOMATIC GAIN CONTROL. The automatic gain control stage, V308B, is one half of a 5896 twin diode. A delayed automatic gain control circuit is used to prevent attenuation of weak signals. The 1.7-mc second i-f signal from terminal 4 of transformer T304 is coupled to the plate of V308B by C349 in M-1 through M-7 units (see Figure 4–9), and by C345 and C349 in M-8 and higher units (see Figure 4–9A). V308B is connected as a shunt rectifier to provide the required negative d-c voltage for the agc circuit. R335 is the diode rectifier load resistor. R334 and R337 form a voltage divider network connected between the +220-volt supply and the plate of V308B. The agc voltage is taken from the junction of R334 and R337. A type 1N462 diode, CR305, connected between the agc line and ground, is used as a clamping diode to prevent the agc line from swinging

above +0.5 volt dc. If CR305 were not present, the voltage on the agc line, under no-signal conditions, would be approximately +9 volts due to current flow through R334 and R337, and V308B to ground. With CR305 connected to the agc line, however, the minimum bias voltage on the agc line, under no-signal conditions, actually is +0.5 volt due to current flow through R334 and CR305 to ground. The voltage of approximately +9 volts represents the agc delay voltage which the agc rectifier circuit must overcome before a negative voltage will appear on the agc line.

When a 1.7-mc signal appears at the plate of V308B, a negative rectified voltage appears at the junction of R335 and R337. When the 1.7-mc signal increases in strength to the point where −9 volts appear at the junction of R335 and R337, the rectified voltage now equals the agc bias voltage and a further increase in the 1.7-mc signal will cause the agc voltage to decrease from its +0.5-volt value and swing negative. CR305 will not conduct as long as the agc line remains negative. R337 and C369 form a low-pass filter which removes the audio-frequency components from the agc voltage. Agc voltage is applied through RC decoupling networks to the grids of V301, V302, V303, V305, and V306. The minimum agc voltage is approximately +0.5 volt; the maximum voltage obtained with very strong signals will be approximately −10 volts.

SQUELCH CIRCUIT. The squelch circuit consists of a squelch diode and a squelch amplifier (see Figure 4–9). A 1N459 diode, CR303, used as the squelch diode, is connected between the automatic noise limiter, CR304, and the grid of V311A. The primary function of the squelch circuit is to prevent noise from reaching the audio section of the receiver in the absence of an incoming signal of some predetermined minimum level. The squelch circuit is also used to mute the audio frequency circuit during the tuning cycle of the channel selector switches. The squelch diode is used as an electronic switch, permitting the audio signal to pass when the diode is conducting and cutting off the audio signal when it is not conducting. The SQUELCH potentiometer, R211, located on the front panel of the RT-11A, is used to adjust the squelch threshold level.

Both the cathode and the anode of the squelch diode are biased. The cathode, which is connected to the a-f output of the noise limiter by C366, is biased at +110 volts by the voltage divider consisting of R359 and R360. The anode is connected through isolation resistor R358 to the variable bias furnished by the plate voltage of the squelch amplifier, V311B. C364 is used to bypass high-frequency audio components. The output of the squelch diode is coupled to the grid of V311A by C365.

The squelch amplifier, V311B, is one half of a 6112 twin triode. R353 and R354 are the cathode and plate load resistors, respectively. The grid of the squelch amplifier is connected to the negative d-c output voltage of the agc rectifier, V308B, through the a-f filter network consisting of R336, R361, C367, and C368. The grid is also connected through R350 to a variable voltage divider source (0 to approximately +20 volts) consisting of SQUELCH control R211, squelch maximum limit control R218, and resistor R209. In M-8 or higher units, R220 was added to this circuit (see Figures 4–9 and 4–9A). R218, an internal control, is factory-adjusted to set the maximum range of R211 to approximately 25 microvolts. During the tuning cycle of the channel selector switches, the grid is connected through R351 to the +28-volt (or +14-volt) dc supply to mute the receiver audio circuit.

In normal operation, with no received signal and with R211 set fully counterclockwise to its minimum threshold position, V311B conducts and draws a small amount of plate current. The plate voltage appearing at pin 8 of V311B, which is coupled to CR303 through R358, is greater than the +110 volts fixed bias on the cathode of CR303 so that CR303 conducts and the a-f path to the grid of V311A is closed.

With no received signal, as R211 is rotated clockwise toward the maximum threshold position, the grid bias of V311B goes more positive causing the tube to draw more plate current until the setting is reached where the plate voltage at pin 8 drops below +110 volts, at which point CR303 stops conducting. R211 is normally left at this setting, preventing noise from passing to V311A. When a signal which exceeds the noise level is received, the negative voltage output appearing at pin 5 of agc rectifier V308B is coupled through the a-f filter network (R336, C367, R361, C368) to the grid of V311B causing the plate voltage to rise and permitting CR303 to conduct. Thus, the audio signal from V308A is passed through CR303 to V311A.

The receiver audio circuit is muted during the tuning cycle by connecting the grid of V311B through R351 to the +28-volt (or +14-volt) dc supply, causing V311B to conduct heavily, dropping the plate voltage, and cutting off CR303.

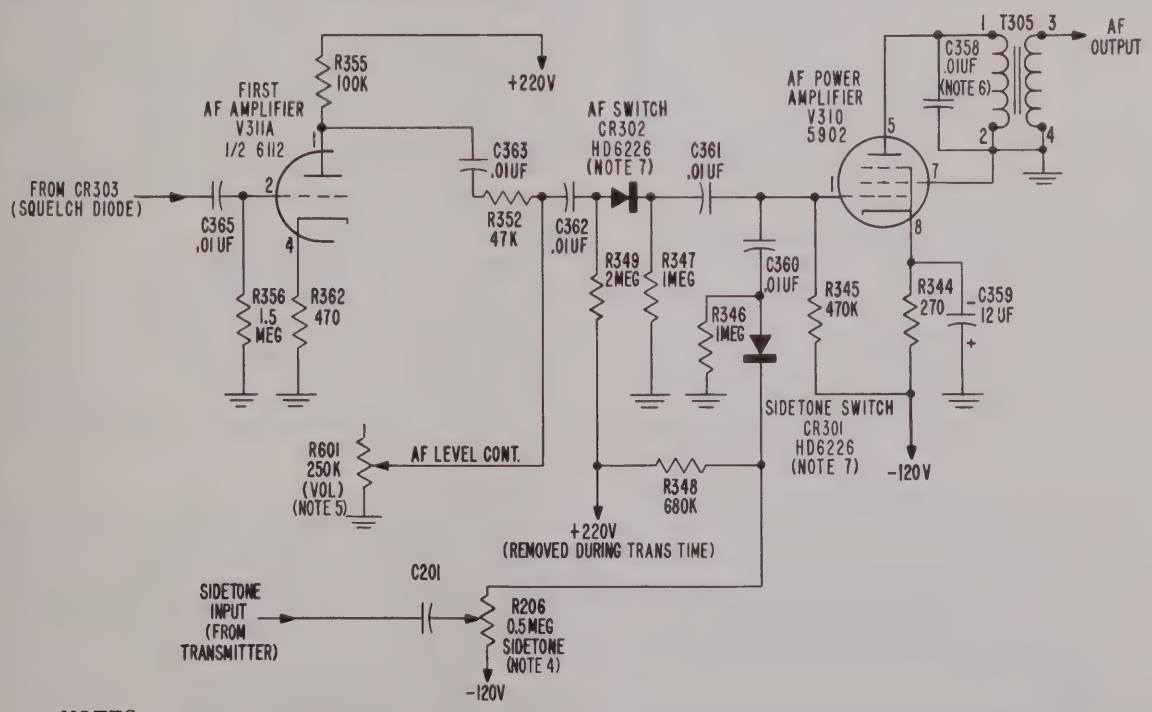
In M-6 and higher units, CR306, connected between the plates of V311A and V311B, limits the transient caused by the sudden application of muting voltage to the grid of V311B at the start of the tuning cycle. In addition, this diode conducts during the absence of a signal and thus provides further reduction of audio output under squelch conditions. CR101, CR102, and CR307, connected in parallel with the solenoids of latching relays K101, K102, and K301, respectively (see Figure 6–1A),

limit the inductive surges of the relay coils when de-energized at the end of a tuning cycle.

FIRST A-F AMPLIFIER. One half of a 6112 twin triode, V311A, connected as a voltage amplifier, is used for the first a-f amplifier (see Figure 4–10). The a-f signal from CR303 is coupled to the grid of V311A by C365. The signal is amplified by V311A and the output is coupled to the a-f power amplifier stage through C363, R352, C362, CR302, and C361. Grid bias for V311A is furnished by R362. R356 and R355 are the grid leak and plate load resistors, respectively. The overall gain for the received audio signal is adjusted by VOL control R601, located on the C-67A Control Unit, which is connected in shunt with the a-f path from V311A to V310. R352 is used to improve the low-frequency response for low-level settings of R601.

SIDETONE AMPLIFIER CIRCUIT. To eliminate the need for a separate sidetone amplifier in the receiver, the sidetone output of the transmitter uses the audio power amplifier, V310, as a sidetone amplifier during transmission periods. This function of V310 is accomplished without interaction between the adjustable receiver output and the fixed sidetone output levels by using the sidetone circuit shown in Figure 4–10. During receive conditions, the anode of the a-f switching diode, CR302, is made positive by application of the +220-volt dc supply through R349. R347 provides a d-c return through CR302 to ground. Therefore, CR302 conducts and provides an audio frequency path from the plate of V311A to the grid of V310. At the same time, CR301, the sidetone switch diode, is made nonconductive by the application of the +220-volt supply through R348, which bucks out the negative voltage applied through the SIDETONE control, R206, located on the front panel of the RT-11A. Thus the cathode of CR301 is made positive with respect to the anode which is d-c grounded through R346.

During transmit conditions, the +220-volt dc supply is disconnected and the junction of R348 and R349 is grounded. Under this condition, CR302 opens the a-f path from V311A and CR301 conducts, since with the removal of the +220-volt dc supply, the cathode of CR301 is made negative by the −120-volt dc supply through R206. Thus a path for the sidetone input signal is established through C201, R206, CR301, and C360 to the grid of V310. The sidetone signal is obtained by rectifying a small portion of the modulated transmitter output.



NOTES:

1. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F), UNLESS OTHERWISE NOTED.
2. RESISTANCE VALUES ARE IN OHMS. MULTIPLIERS: K = 1000; MEG = 1,000,000.
3. SECTIONS OF TWIN TUBES ARE IDENTIFIED BY A AND B FOR REFERENCE PURPOSES.
4. R206 IS LOCATED IN RT-11A CHASSIS ASSEMBLY (A201).
5. R601 IS LOCATED IN C-67A CONTROL UNIT.
6. C358 WAS .022 μF IN M-1 THROUGH M-6 UNITS.
7. CR301 AND CR302 WERE 1N462 IN M-1 THROUGH M-7 AND SOME M-8 UNITS.

TP1307 B

Figure 4–10. Audio Amplifier and Sidetone Circuit, Schematic Diagram

A-F POWER AMPLIFIER. The a-f power amplifier, V310, is a type 5902 beam power pentode. The a-f signal from V311A (receive condition) or the sidetone signal from the transmitter (transmit condition) is coupled to the grid of V310 through C361 or C360, respectively (see Figure 4–10). V310 amplifies either input signal and delivers it to the audio output transformer, T305. T305 is a 3000 300-ohm stepdown transformer having a frequency response of 400 to 3000 cps.

V310 is operated "below ground" as follows: The cathode of V310 is connected to the ungrounded lead of the −120-volt dc supply through R344. The grid of V310 is returned to the −120-volt dc supply through R345. The plate of V310 is connected to the positive side (ground) of the −120-volt dc supply through the primary of T305. C358 is connected across the primary of T305 to establish the high-frequency cut-off for the audio circuit at approximately 3000 cycles per second. The a-f signal from the secondary of T305 is connected to the 300-ohm headset (TEL) line.

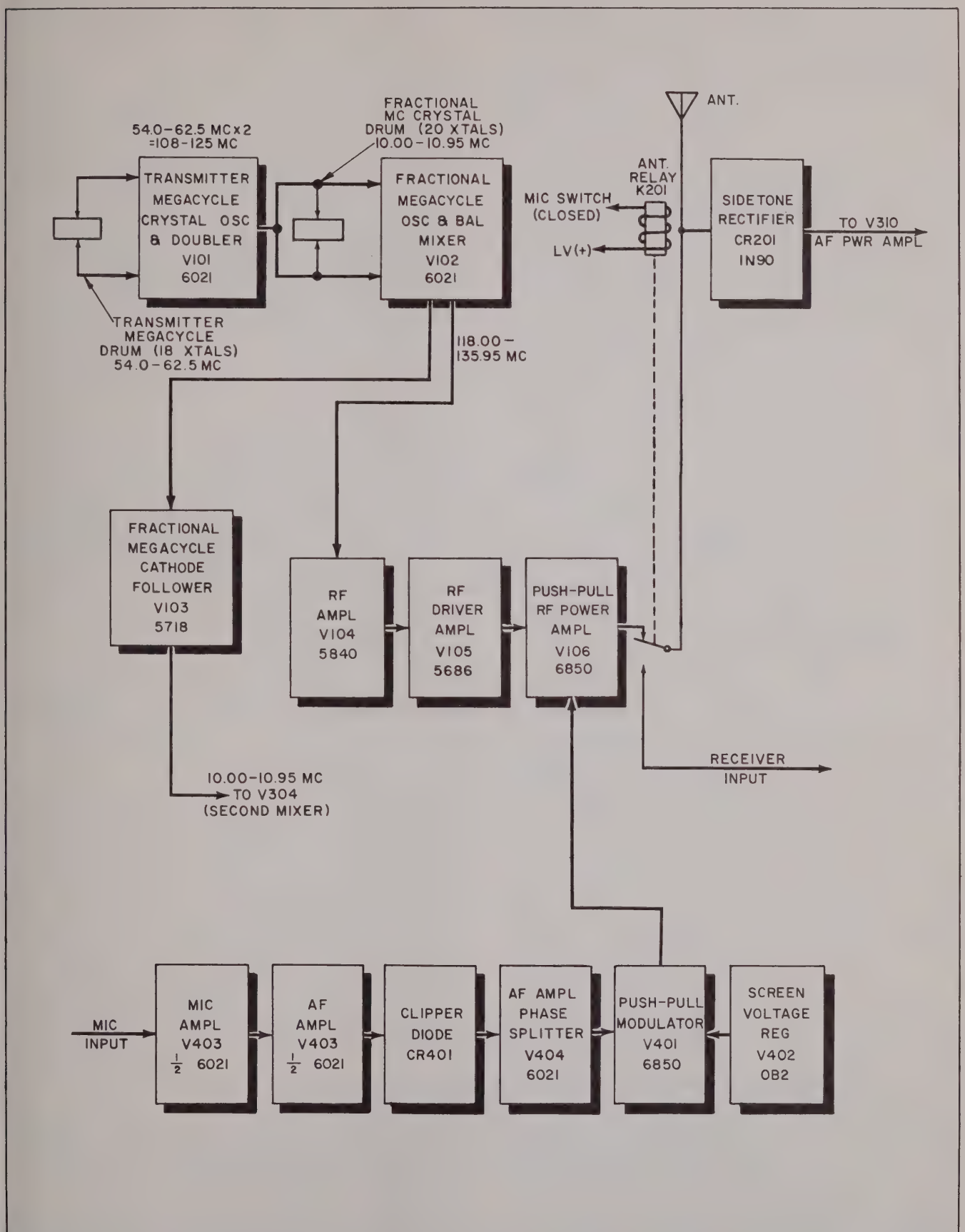
Transmitter Assembly. As shown in Figure 4–11, the transmitter assembly consists of a megacycle crystal oscillator-doubler, a fractional megacycle oscillator-balanced mixer, a fractional megacycle cathode follower, an r-f amplifier, an r-f driver amplifier, and a push-pull power amplifier. During transmission, antenna relay K201 is energized, transferring the vhf antenna from the receiver input to the transmitter output. One of the 360 channels available in the 118.00- to 135.95-megacycle band is selected by switch action in the C-67A Control Unit. The r-f output signal is obtained by combining a whole megacycle signal with a fractional megacycle signal. The whole megacycle r-f signal (108-125 mc) is generated by a crystal oscillator-doubler, V101, whose fundamental frequency is determined by connecting one of 18 drum-mounted subminiature crystals (54.0-62.5 mc in 0.5-mc steps) to the crystal oscillator input. The fractional megacycle r-f signal is generated by a crystal oscillator, part of V102, whose frequency is determined by connecting one of 20 drum-mounted subminiature crystals (10.00-10.95 mc in 0.05-mc steps) to the crystal oscillator input. A cathode follower, V103, is used to couple the output of the fractional megacycle oscillator to the receiver second mixer, V304. The whole megacycle and fractional megacycle signals are combined in the balanced mixer, part of V102, to generate a low-voltage r-f signal at the desired frequency (118.00-135.95 mc). The r-f voltage is amplified by two stages of r-f amplification, V104 and V105, and then coupled to the output stage, V106. This stage is a balanced, push-pull r-f amplifier which is plate and screen modulated by voice frequencies from the modulator, V401. The r-f output voltage (118.00-135.95 mc) is fed to the antenna through the normally open contacts of antenna relay K201. The functioning of the individual circuits in the transmitter assembly are described in the following paragraphs.

TRANSMITTER MEGACYCLE CRYSTAL OSCILLATOR-DOUBLER. The transmitter megacycle crystal oscillator-doubler uses a 6021 twin triode, V101, in a Butler cathode-coupled, series-mode, crystal oscillator-doubler circuit (see Figure 4–12). The function of this stage is to generate the megacycle portion of the transmitter r-f signal, which is combined with the fractional megacycle r-f signal in the balanced mixer section of V102. Depending upon the setting of the megacycle channel selector switch, S602A, in the C-67A Control Unit, one of the crystals mounted on the transmitter megacycle crystal drum (refer to paragraph 4–2) is connected between the cathodes of V101.

The Butler oscillator operates as follows: L103, tuning capacitor C107B, and trimmer capacitor C106 form a tank circuit which is coupled to the plate of V101A by C104. The tank circuit is tuned to the resonant frequency of the crystal (54.0-62.5 mc). Oscillations appearing at the plate of V101A are coupled to the grid of V101B through C102. Since V101B is a cathode follower, its output cathode voltage is in phase with the output from V101A. The oscillator crystal, Y101-Y118, oscillating in the series-resonant mode, acts as a low-value pure resistance at its resonant frequency and transmits the voltage appearing at the cathode of V101B to the cathode of V101A. In turn, V101A, connected as a grounded-grid amplifier, reinforces the oscillations at its plate. Thus the positive feedback necessary to sustain oscillation is obtained, but only at the frequency at which the crystal is resonant.

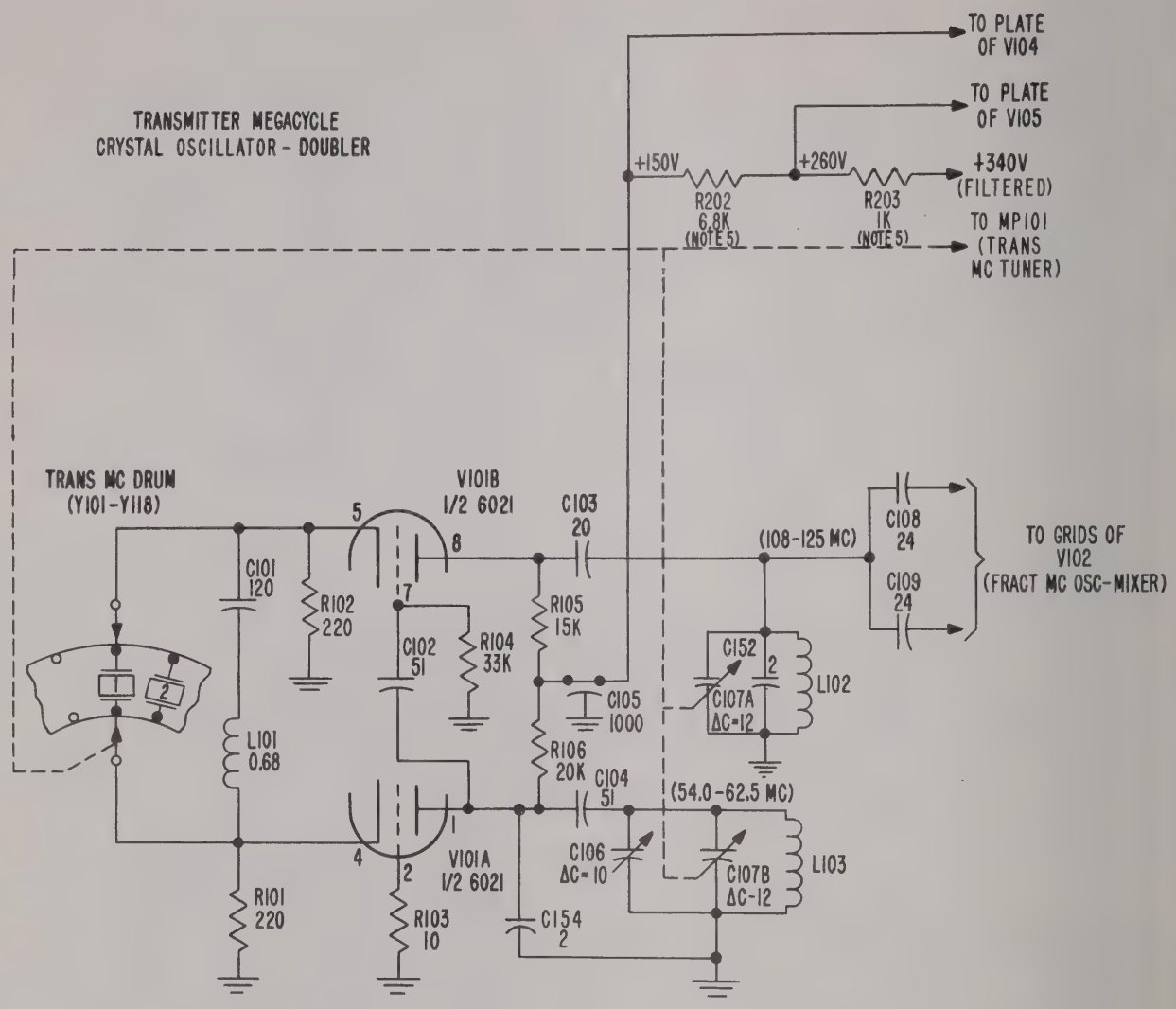
Frequency doubling is accomplished by tuning the plate circuit of V101B to the second harmonic (108-125 mc) of the crystal oscillator. L102 and C107A comprise the doubler tank circuit which is connected to the plate of V101B by C103. C152 is a trimmer capacitor. The output of the doubler is coupled to the grids of V102 by C108 and C109.

R101 and R102 are the cathode load resistors for V101A and V101B, respectively. A series network consisting of L101 and C101 is connected in parallel with the crystal (Y101-Y118). L101 resonates with the crystal shunt capacitance to insure that the crystal acts as a pure resistance at its resonant frequency. C101 is used as a d-c blocking capacitor. R103 is used to suppress parasitic oscillations. R106 and R105 are the plate load resistors for V101A and V101B, respectively. C105 is used as an r-f bypass capacitor for the plate supply voltage. R202 and R203, located in the RT-11A chassis assembly, are used to drop the +340-volt dc supply voltage to the +150 volts required for the plates of V101. Grid bias for V101B is provided by the voltage drop across R102 and R104.



TP1163

Figure 4–11. ARC Type RT-11A Receiver-Transmitter, Transmitter and Modulator Assemblies, Block Diagram



NOTES:

1. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F).
2. RESISTANCE VALUES ARE IN OHMS. MULTIPLIER: K=1,000.
3. INDUCTANCE VALUES ARE IN MICROHENRIES (μH).
4. SECTIONS OF TWIN TUBES ARE IDENTIFIED BY A AND B FOR REFERENCE PURPOSES.
5. R202 AND R203 ARE LOCATED IN THE RT-11A CHASSIS ASSEMBLY (A201).

TP1309A

Figure 4–12. Transmitter Megacycle Crystal Oscillator-Doubler, Schematic Diagram

FRACTIONAL MEGACYCLE CRYSTAL OSCILLATOR-BALANCED MIXER. A 6021 twin triode, V102, is used as a push-pull Pierce crystal oscillator and balanced mixer (see Figure 4–13). This stage generates the fractional megacycle portion of the transmitter r-f signal and combines it with the megacycle portion of the r-f signal generated by V101. Depending upon the setting of the fractional megacycle channel selector switch, S602B, in the C-67A Control Unit, one of the crystals (10.00-10.95 mc) mounted on the fractional megacycle crystal drum (refer to paragraph 4–2) is connected between the grids of V102. The grids are also fed with 108- to 125-mc signals from V101. The plates of V102 are bypassed for the 10.00- to 10.95-mc crystal oscillator signals, but the plate tank circuit is tuned to resonate to the sum frequency of both signals (118.00-135.95 mc) to accomplish the mixing function.

The 108- to 125-mc signal input from V101 is parallel-fed to the grids of V102 through C108 and C109. R108 and R109 provide the d-c return to ground for the balanced grid circuit. C111 and C113 form a 1:10 r-f voltage divider for the grid-to-rf ground circuit of V102B. The r-f voltage developed across C111 is the oscillator feedback voltage for V102B. C112 and C114 form a similar r-f voltage divider for the grid-to-rf ground circuit of V102A, with the r-f voltage developed across C112 representing the feedback voltage for V102A. L104 and L105, connected in series with the feedback path of V102B and V102A, respectively, are r-f chokes which pass the 10.00- to 10.95-mc voltages of the crystal oscillator but present a high impedance to the 108- to 125-mc input signals.

The triodes of V102 are operated "below ground" as follows: The cathodes are connected to a −120-volt supply through R112 and R113. C119 and C122 are r-f bypass capacitors for the cathode circuit, and L111 and C123 provide further r-f decoupling for the −120-volt supply. L106 is connected between the cathodes to provide greater oscillator stability and output. The plates of V102A and V102B are connected to ground (+120 volts dc) through L109 and L108, respectively. L108 and L109 are r-f chokes which bypass the 10-mc crystal oscillator voltage to ground, but act as a high impedance to the mixer output signals (118.00-135.95 mc). R129 is a parasitic suppressor.

The balanced mixer output is coupled to the tank circuit through C115 and C116. The tank circuit is both inductance-tuned and capacitance-tuned to resonate at the sum frequency of the two input signals. The slug-tuned coil, L110, is resonated to the fractional portion of the sum frequency by connecting the slugs to a cam on the fractional megacycle tuner drive shaft. C118 is a split-stator capacitor connected to the cam-driven main (or megacycle) tuning plate. C120 is a fixed trimmer capacitor. One side of the mixer tank circuit is connected to the grid of V104; the other side is connected to ground through R116, the grid resistor for V104. C121 is a trimmer capacitor used to balance the grid circuit-to-ground capacitance of V104.

FRACTIONAL MEGACYCLE CATHODE FOLLOWER. A type 5718 triode, V103, is used as the fractional megacycle cathode follower (see Figure 4–13). This stage provides low-impedance coupling of the 10.00- to 10.95-mc crystal signal to the receiver for use as a fractional megacycle injection signal to the second mixer stage, V304. V103 is operated below ground with the cathode connected to −120 volts dc through R114 and the plate returned to ground through R115. The fractional megacycle crystal oscillator voltage is obtained at the junction of L104 and C111 in the grid-cathode circuit of V102B and is coupled to the grid of V103 by C110. The 10.00- to 10.95-mc output voltage appearing at the cathode is coupled to V304 through a vhf filter network consisting of L107 and C117.

R-F AMPLIFIER. The r-f amplifier, V104, is a 5840 pentode. The 118.00- to 135.95-mc output of V102 is connected directly to the grid of V104 (see Figure 4–14), and the d-c return path for the grid to ground is through R116 (see Figure 4–13). The input voltage is amplified by V104 and the output appearing at the plate tank circuit is coupled to the grid of V105 through C126.

R202 and R203, located in the RT-11A chassis assembly, are used to drop the +340-volt dc supply voltage to the +150 volts required for the plate circuit of V104. The plate tank circuit consisting of L113 and C129 is coupled to the plate through C125. The r-f output of the tank circuit is coupled to the grid of V105 through C126.

R-F DRIVER-AMPLIFIER. A 5686 pentode is used for the r-f driver-amplifier, V105. The 118.00- to 135.95-mc output of V104 is connected to the grid of V105 (see Figure 4–14). The signal is amplified further by V105 and the balanced output of the plate tank circuit is coupled to the grids of the push-pull power amplifier, V106, through C135 and C136.

R118 and R119 provide operating bias for V105. A test point, TP1, for checking grid bias, is provided at the junction of R118 and R119. A second test point, TP2, is provided at the cathode for checking the cathode voltage. L115 and C134 comprise the balanced plate tank circuit which is decoupled from the d-c plate supply by L114 and C130. R203, located in the chassis assembly, is used to drop the +340-volt dc supply to +260 volts for V105. L115 is tuned to the fractional portion of the r-f signal frequency by connecting the slugs to a cam on the fractional megacycle tuner drive, while C134 is connected to the main (or megacycle) tuning plate.

C135 and C136 couple the balanced output of the tank circuit to the grids of V106. C133 is used to balance the plate circuit-to-ground capacitance of V105.

PUSH-PULL POWER AMPLIFIER. The push-pull power amplifier uses a 6850 twin tetrode, V106. The 118.00- to 135.95-mc r-f output of V105 is coupled to the grids of V106 by C135 and C136 (see Figure 4–14). The r-f signal is amplified by V106 and the output voltage appearing in the plate tank circuit is inductively coupled to the antenna by the low-impedance pickup loop, L120. The r-f carrier output of V106 is both plate- and screen-modulated by the modulator stage, V401.

The balanced d-c return path for one grid consists of L116, R122, and R123; for the other grid, it consists of L117, R124, and R123. A test point, TP3, is provided at the junction of resistors R122, R123, and R124 for checking grid bias of the power amplifier. A test point, TP4, is provided at the cathode for checking the cathode operating voltage. The screens are tied together and connected to a tap on modulation transformer, T201, through R126. The balanced plate tank circuit consists of C143 and L118. The center tap of L118 is connected to T201 through a decoupling network consisting of L119, R128, and C144. A low-impedance pickup loop, L120, is used to couple the r-f output of V106 to the ANT jack, J208, through filter assembly Z101 and the normally open contacts of antenna relay K201. Filter assembly Z101 is a low-pass filter designed to pass the fundamental transmitting frequencies (118.00-135.95 mc) and to reject harmonic frequencies.

The unmodulated carrier output of the RT-11A is 12 to 18 watts throughout its tuning range. High level modulation of the carrier is employed, with high percentage modulation (above 85%) maintained by a diode limiting circuit in the modulator.

SIDETONE RECTIFIER CIRCUIT. The sidetone signal for monitoring transmissions is obtained by rectifying a small portion of the transmitter r-f output (see Figure 4–15). The sidetone rectifier circuit, consisting of R204, R205, R219, CR201, and C201, is mounted on the frame of the antenna relay, K201. R204 and R205 form a high-resistance voltage divider which is connected between the antenna line and ground. CR201, connected to the voltage divider tap, demodulates the r-f carrier signal. The resultant a-f sidetone voltage appearing across R219 is coupled to the movable arm of R206 through C201. C202 is the r-f bypass capacitor for the detector circuit and is mounted on the chassis partition plate. During transmission periods only, one side of R206 is connected to the grid of V310 through CR301 and C360 (see Figure 4–10). The other side of R206 is returned to the −120-volt dc supply, which represents the grid circuit return path for V310. The amount of sidetone voltage applied to the grid of V310 during transmission periods is controlled by adjusting R206, located on the front panel of the RT-11A.

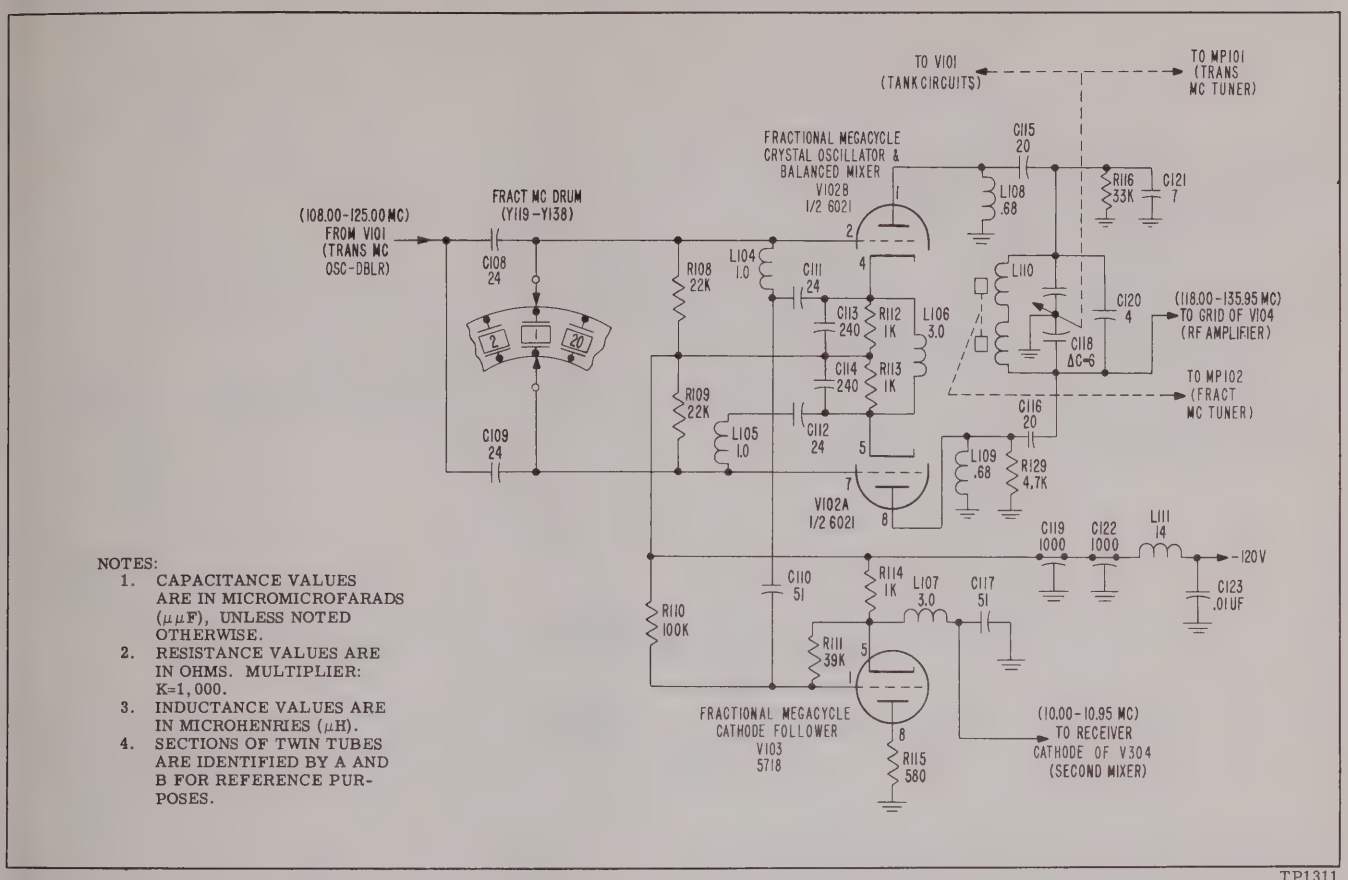
Modulator Assembly. As shown in Figure 4–11, the modulator assembly consists of a microphone amplifier, an audio amplifier, a diode speech clipper, an audio amplifier-phase inverter, a push-pull modulator, and a screen voltage regulator. The audio signal from the microphone is amplified by two stages of amplification, V403, and then fed to a diode speech clipper which clips the positive peaks of large a-f signals to prevent overmodulation. The a-f output of the speech clipper is further amplified by an a-f amplifier-phase splitter, V404, and coupled to a push-pull modulator tube, V401. The a-f output of V401 is connected between the high-voltage supply and the plate and screens of the r-f output stage, V106, to accomplish amplitude modulation of the r-f carrier. The functioning of the individual circuits in the modulator assembly are described in the following paragraphs.

MICROPHONE AMPLIFIER. One half of a 6021 twin triode, V403A, is used for the microphone amplifier. The voice output of the microphone is applied to the grid of V403A through C403 (see Figure 4–16). The a-f signal is amplified by V403A and coupled to the grid of a-f amplifier V403B through C406.

R210, R212, and R214 are used to establish proper d-c operating current for the microphone. C203 and C204 with R212 and R214 form a network to decouple the microphone circuit from the low-voltage supply. C205 is used as an r-f bypass capacitor for the microphone input circuit. C412, connected between the grid and cathode of V403A, is used as an r-f feedback suppressor for the modulator circuit. R410 is the plate load resistor and C406 couples the a-f output of V403A to the grid circuit of V403B. Resistor R213 (located in the chassis assembly) is used to drop the +340-volt dc supply to +225 volts, required for the plate circuits of V403 and V404. C206 (located in the chassis assembly) is used as an a-f bypass capacitor.

A-F AMPLIFIER-CLIPPER DIODE CIRCUIT. One half of a 6021 twin triode, V403B, is used as an audio amplifier. The a-f output of V403A is further amplified by V403B and coupled to the grid of the next a-f amplifier, V404A, through C410 and C411 (see Figure 4–16). A Zener diode, CR401, connected between the junction of C410 and C411 and chassis ground, is used as a speech input clipper. The diode circuit is designed to pass any a-f signal below a 7.0-volt peak-to-peak level. When the output of V403B exceeds this level, both the positive and negative peaks of the a-f signal are clipped, thus preventing over-modulation of the r-f carrier.

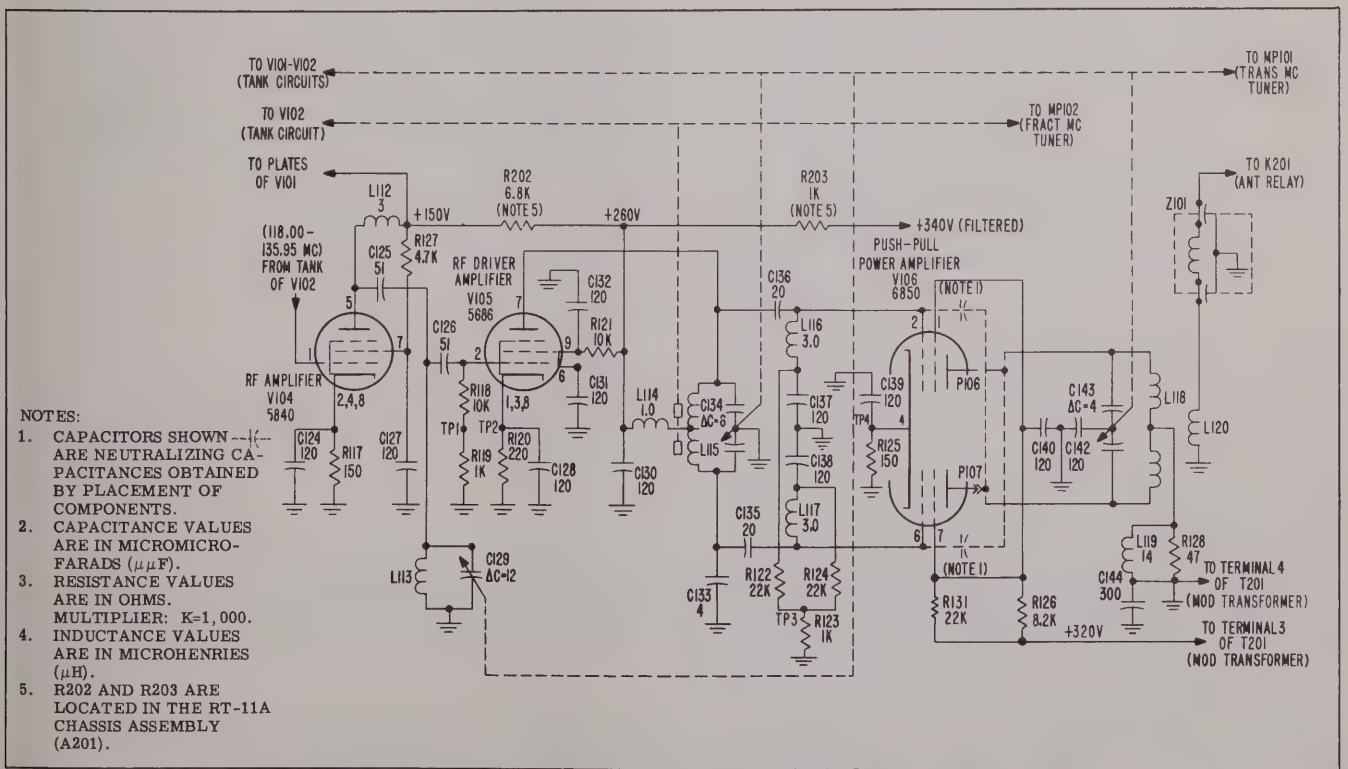
R412 serves as the grid resistor for V403B. This control is adjusted at the factory to set the clipping level of



NOTES:
1. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F), UNLESS NOTED OTHERWISE.
2. RESISTANCE VALUES ARE IN OHMS. MULTIPLIER: K=1,000.
3. INDUCTANCE VALUES ARE IN MICROHENRIES (μH).
4. SECTIONS OF TWIN TUBES ARE IDENTIFIED BY A AND B FOR REFERENCE PURPOSES.

TP1311

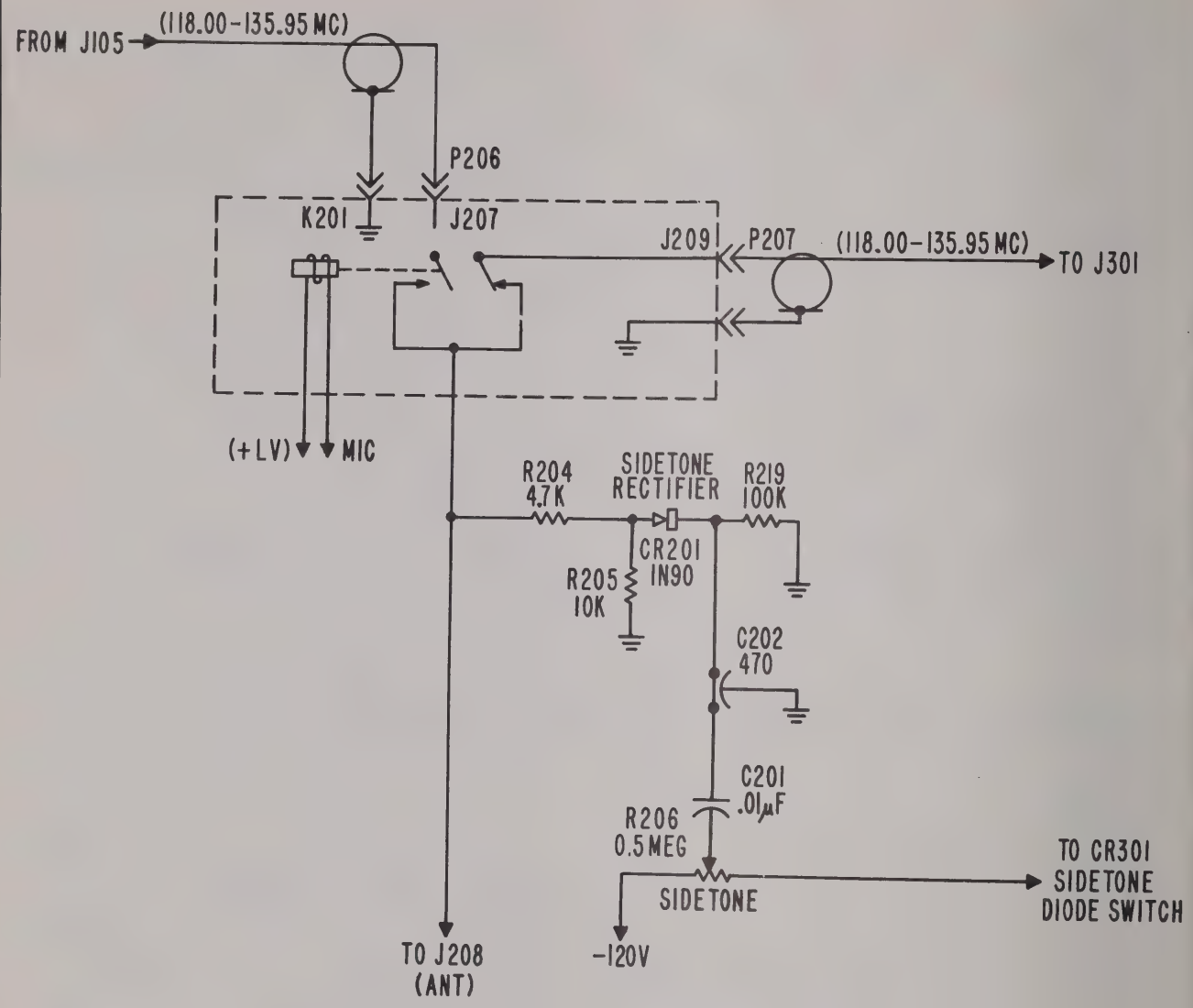
Figure 4–13. Fractional Megacycle Crystal Oscillator-Balanced Mixer and Cathode Follower, Schematic Diagram



NOTES:
1. CAPACITORS SHOWN --||-- ARE NEUTRALIZING CAPACITANCES OBTAINED BY PLACEMENT OF COMPONENTS.
2. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F).
3. RESISTANCE VALUES ARE IN OHMS. MULTIPLIER: K=1,000.
4. INDUCTANCE VALUES ARE IN MICROHENRIES (μH).
5. R202 AND R203 ARE LOCATED IN THE RT-11A CHASSIS ASSEMBLY (A201).

TP1313 A

Figure 4–14. R-f Amplifiers, Schematic Diagram

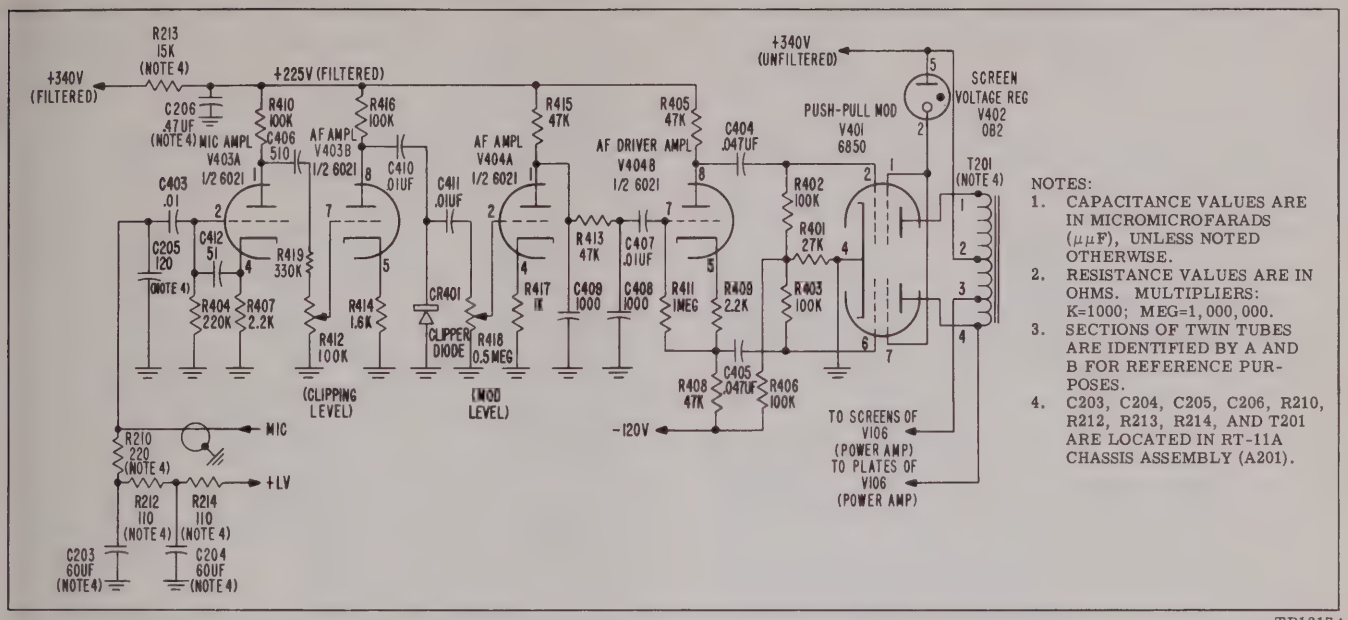


NOTES:

1. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F), UNLESS NOTED OTHERWISE.
2. RESISTANCE VALUES ARE IN OHMS. MULTIPLIERS: K=1,000; MEG=1,000,000.

Figure 4–15. Antenna Relay and Sidetone Rectifier, Schematic Diagram

TP1315



TP1317A

Figure 4–16. Modulator Assembly, Schematic Diagram

CR401 at a 1.0-volt microphone input signal. Operating bias for V403B is established by R414. Resistor R416 is the plate load resistor, and C410 couples the output of V403B to CR401.

The Zener diode is a two-way device which functions as a normal diode in the forward current direction and as an opposite-polarity diode in the reverse current direction when the reverse breakdown voltage or Zener voltage is exceeded. In the equivalent circuit, shown in Figure 4–17, the Zener diode is replaced by two diodes: diode A represents CR401 conducting in the forward direction and diode B represents CR401 conducting in the reverse direction, with a 7.0-volt bias battery representing the 7.0-volt Zener breakdown voltage. As long as the a-f output voltage of C403B does not exceed 7.0 volts, peak-to-peak, the Zener diode circuit will allow the signal to pass to the grid of the next stage without any clipping action. Once the 7.0-volt level is exceeded, the Zener diode will clip the positive peaks, due to breakdown in the reverse direction, and the negative peaks, due to normal conduction in the forward direction, thus effectively limiting the a-f output of V403B to the desired value.

A-F AMPLIFIER. The a-f amplifier uses one half of a 6021 twin triode, V404A. The a-f output of V403B is amplified by V404A and coupled to the grid of driver amplifier V404B through R413 and C407 (see Figure 4–16).

The input to the grid of V404A is varied by the setting of R418. This control is adjusted at the factory to set the overall gain of the modulator to obtain 90% modulation of the r-f carrier for a 1.0-volt microphone input. C408, C409, and R413 form a low-pass a-f filter which is used to couple the output of V404A through C407 to V404B.

PHASE INVERTER. The a-f output of V404A is amplified by V404B which is used as a phase inverter to drive the grids of the push-pull modulator, V401. V404B furnishes two balanced a-f output voltages which are 180° out of phase with each other.

R405 and R408 are the balanced plate and cathode load resistors from which the outputs are taken. The two outputs are coupled to the grids of the push-pull modulator, V401, through C404 and C405.

PUSH-PULL MODULATOR. A 6850 twin tetrode, V401, is used for the push-pull modulator stage. The a-f power output of V401 is connected to T201 which is used to modulate the r-f output of the push-pull amplifier, V106 (see Figure 4–16).

R406 and R401, connected between the −120-volt dc supply and ground, form a voltage divider network to establish a fixed operating bias of −25 volts dc for the balanced grid circuit. R402 and R403 are the grid resistors, and the cathode of V401 is connected directly to ground. The screen grids are paralleled and connected to a regulated 235-volt dc supply provided by a type 0B2 voltage regulator tube, V402, connected in series with the screens and the +340-volt unfiltered dc supply. The plates of V401 are connected to terminals 1 and 4 of the modulation audio transformer, T201. Terminals 2 and 4 of T201 form the output winding, with terminal 2 connected to +340 volts dc, unfiltered, and terminal 4 connected to the plate tank circuit of V106. The screens of V106 are connected to a tap, terminal 3 of the output winding.

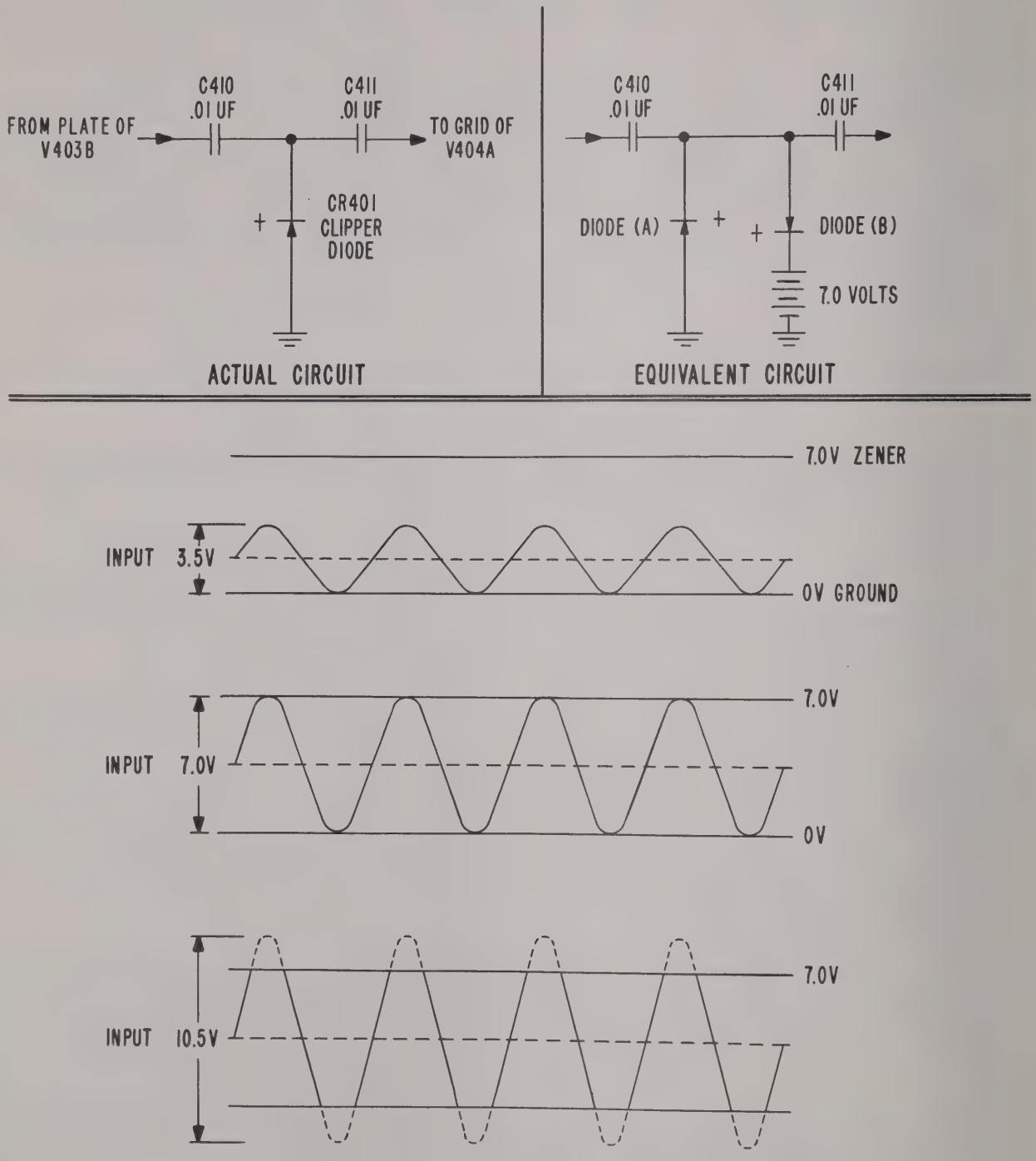


Figure 4–17. Zener Diode Circuit, Schematic Diagram

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Relay Circuits. The antenna relay, K201, and the receive-transmit relay, K202, perform all switching functions (except frequency selection) in the RT-11A (see Figure 4–18). During the receive condition, when both relays are unenergized, K201 connects the antenna to the input of the receiver assembly, and K202 functions as follows:

1. Connects the audio output of the receiver to the headset (TEL) line, pin A of J211.

2. Connects the negative side of the +340-volt dc supply to the negative side of the −120-volt dc supply. (Since the positive terminal of the 120-volt supply is permanently grounded, the two d-c supplies are thus connected with outputs bucking.)

3. Connects the positive side of the +340-volt dc supply to the receiver plate circuits. (Since the outputs of the +340-volt and −120-volt supplies are connected with outputs bucking, as noted previously, the +340-volt filtered supply furnishes +220 volts during the receive condition. A screen voltage of +150 volts is also obtained from the +220-volt lead by the use of voltage dropping resistors, R207 and R208.)

During the transmit condition, when both relays are energized by the microphone key circuit, K201 transfers the antenna to the r-f output of the transmitter assembly, and K202 functions as follows:

1. Transfers the audio output (sidetone) of the receiver to the sidetone line, pin F of J211.

2. Transfers the negative side of the +340-volt dc supply from the negative side of the −120-volt dc supply (outputs bucking) to ground.

3. Transfers the positive side of the +340-volt dc supply from the +220-volt receiver plate circuits to the transmitter and modulator plate circuits. (The full, filtered +340-volt supply is now connected to pin 12 of K202. R213 reduces this voltage to +225 volts for use in the modulator plate circuits. C206 is used as an a-f bypass capacitor. Similarly, R203 and R202 are used to drop the +340 volts to +260 volts and +150 volts, respectively, for use in the transmitter plate circuits.)

4. Connects the unfiltered lead of the +340-volt dc supply (not used in the receive condition) to the plate and screen circuits of the transmitter and modulator power output tubes.

Low voltage for K201 and K202 is supplied from pin 1 of P202 which is connected to the low-voltage supply in series with the normally closed contacts of transmitter tuner assembly relays K101 and K102. During the tuning cycle, either K101 or K102, or both, are energized, disconnecting the low voltage from pin 1 of P202 and muting the transmitter by preventing either K201 or K202 from operating. Receiver muting is accomplished by applying low voltage to the grid of the squelch amplifier, V311B, which opens the receiver audio circuit during the tuning cycle.

A thyrite resistor, TY201, is connected in parallel with the solenoids of K201 and K202 to limit the inductive surges of the relays when they are de-energized. C208, C209, C210, C211, and C212 are r-f bypass capacitors.

Heater Circuits. The RT-11A Receiver-Transmitter is supplied in both 14-volt and 28-volt dc models. The simplified schematics for the heater circuits of the transmitter, modulator, and receiver assemblies are shown in Figure 6–1.

Referring to the simplified 28-volt schematic for the transmitter-modulator heaters, the circuit consists of two major branches connected in parallel. R215 is used as a voltage dropping resistor, and R201 and R216 are used as heater current balancing resistors. C145, C146, C147, C149, C401, and C402 are heater r-f bypass capacitors. L121 and C148 form an r-f filter for the heater of the push-pull r-f amplifier, V106. For 14-volt operation, the two major branches of the 28-volt heater circuit are separated at their respective voltage midpoints (junction of R215, C145, and C151, and junction of C401 and L121) to obtain four 14-volt heater circuits with a minimum of internal wiring changes.

Referring to the simplified 28-volt schematic for the receiver heaters, the circuit consists of two major branches connected in parallel. C371, C372, C373, C374, C375, and C376 are heater r-f bypass capacitors, and C370 and C378 are heater a-f bypass capacitors. L313 and C374 form an r-f filter for the heaters of the r-f cascode amplifier, V301 and V302, and L314 and C377 form an r-f filter for the heaters of the first and second mixers, V303 and V304. For 14-volt operation, the two major branches of the 28-volt heater circuit are separated at their respective voltage midpoints to obtain four 14-volt heater circuits.

4–6. C-67A CONTROL UNIT.

The C-67A Control Unit includes a volume control combined with a power on-off switch (VOL-OFF), a megacycle channel selector switch, a fractional megacycle channel selector switch, and a mode-of-operation switch (SCS-DCS). As shown in Figure 6–19, initial rotation of the VOL-OFF control will close the rotary switch, S603, applying primary power to K701 in the P-15A Power Unit. K701, in turn, applies primary power to the equipment. The volume control, R601, is connected as a variable shunt resistor across the output of the first audio amplifier, V311A, in the receiver.

The megacycle channel selector switch, S602A, is a geared, 18-position, printed circuit, revolving drum assembly which simultaneously selects one of 18 crystals

on both the 20-position transmitter and receiver megacycle crystal drums, without stopping on the two blank spaces on either drum. The method of channel selection is described in paragraph 4–3. The fractional megacycle selector switch, S602B, is a geared, 20-position, printed circuit, revolving drum assembly which selects one of 20 crystals on the fractional megacycle crystal drum. The binary code employed to meet these switching requirements uses five control wires per crystal drum, and its switching sequence is shown in simplified schematic form in Figure 4–3. The code can be described as two re-entrant ten-digit codes which are also re-entrant with each other to form a twenty-digit code, with the further characteristic that two digits can be removed and re-entrance maintained.

A simplified schematic diagram of the control circuit for the megacycle channel selector switch, S602A, is shown in Figure 4–19. The circuit is shown locked in the 118-mc position. Rotation of S602A to any new position, for example 121 mc, will cause latching relays K301 and K102 and the motor drive circuit to be energized. The megacycle crystal drums, MP101 and MP301, will rotate until their switching codes agree with the code of the master selector switch, at which point open-circuit conditions will be reached, and the drums will be locked in the 121-mc crystal position. The circuit is shown with the mode-of-operation switch, S601, set for SCS operation, i.e., transmitter operating on the same frequency as the receiver. When rotated to the DCS position, switch S601 transfers the five transmitter megacycle crystal drum control leads from one set of wipers on the master selector switch to a second set of wipers located six positions (6 mc) ahead of the SCS position. This change in the switching code causes the transmitter megacycle crystal drum to rotate until it aligns itself with the new master switch position. In the DCS mode of operation, the transmitter operates 6.0 mc above the receiving frequency; however, the channel frequency dial (MC) on the C-67A Control Unit always indicates the receiving frequency.

A simplified schematic diagram of the control circuit for the fractional megacycle channel selector switch, S602B, is shown in Figure 4–20. The circuit is shown locked in the .00-mc position. Rotation of the master selector switch to any new position, for example .85 mc, will cause latching relay K101 and the motor drive circuit to be energized. The fractional megacycle crystal drum, MP102, will rotate until its switching code agrees with that of the master selector switch, at which point open-circuit conditions will be reached, and the drum will be locked in the .85-mc position.

Edge-lighting illumination of the C-67A controls and panel designations is provided by two midget flange-base lamps, DS601 and DS602, installed in red-filter light assemblies on the plastic front panel. Power to these lamps is controlled by the aircraft's panel light control.

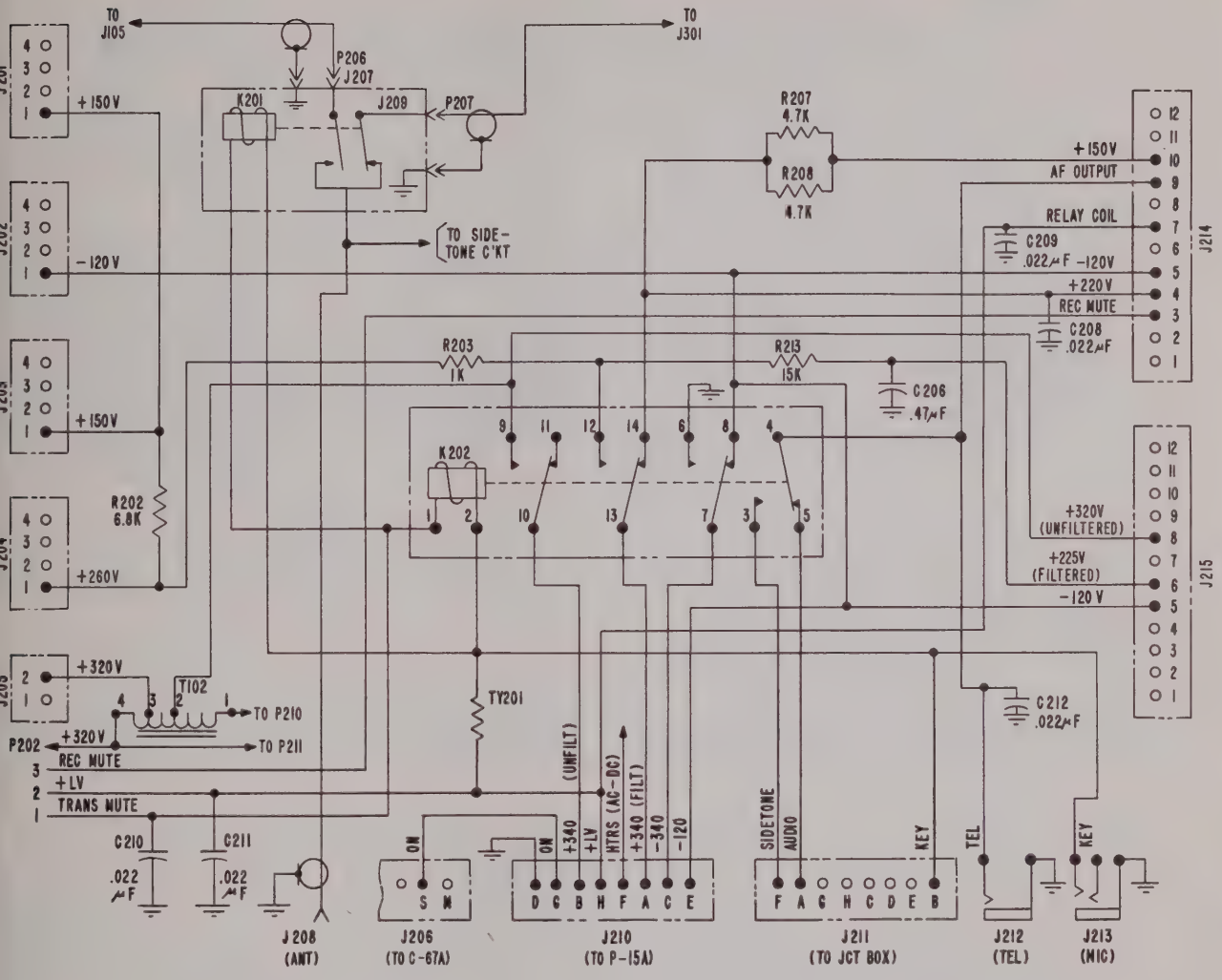
4–7. P-15A POWER UNIT.

The P-15A Power Unit is a double-commutator dynamotor designed to operate from the aircraft's d-c supply and furnish −120-volt and +340-volt dc outputs. The P-15A supplies all the bias and high-voltage requirements of the RT-11A Receiver-Transmitter.

As shown in Figure 6–22, the aircraft's primary low-voltage supply is connected to the P-15A through J701. When the power relay, K701, is energized by the VOL-OFF switch in the C-67A Control Unit, low voltage is applied to the P-15A dynamotor and to the RT-11A heaters and relays through terminals F and H of J702, respectively. Filter assembly Z701 is connected in series with the low-voltage lead to dynamotor D701 to keep "dynamotor hash" from getting back on the low-voltage line. The positive side of the 120-volt supply is permanently grounded and the negative side is brought out to terminal E of J702 through a ripple voltage filter consisting of L701, C701, and C702. The negative side of the 340-volt supply is connected to terminal C of J702, and the unfiltered positive side is brought out to terminal B of J702. The filtered positive side is connected to terminal A of J702 through a ripple filter consisting of L702, C703, and C704. Additional r-f noise suppression is provided by internal .01-μf capacitors connected across the brushes of each high-voltage generator.

Under both receive and transmit conditions, the negative lead of the 120-volt supply is connected to a load consisting of the plate circuits of the fractional megacycle crystal oscillator, V102, the fractional megacycle cathode follower, V103, the receiver audio power amplifier, V310, and the grid bias circuit for the modulator output stage, V401. Under receive conditions, the negative terminal of the 120-volt supply is connected to the negative terminal of the 340-volt supply and the positive filtered terminal of the 340-volt supply is connected to the receiver B+ input, thus providing the receiver with a plate power source of +220 volts to ground. For this condition, where the output of the 120-volt supply is opposing the output of the 340-volt supply, R701 is used as a load balancing resistor for the 120-volt supply and C705 is used to eliminate the beat frequency commutator hum of the combined outputs. During transmit conditions, the negative terminal of the 340-volt supply is grounded, and the 340-volt positive terminals (filtered and unfiltered) are connected to the transmitter and modulator plate circuits.

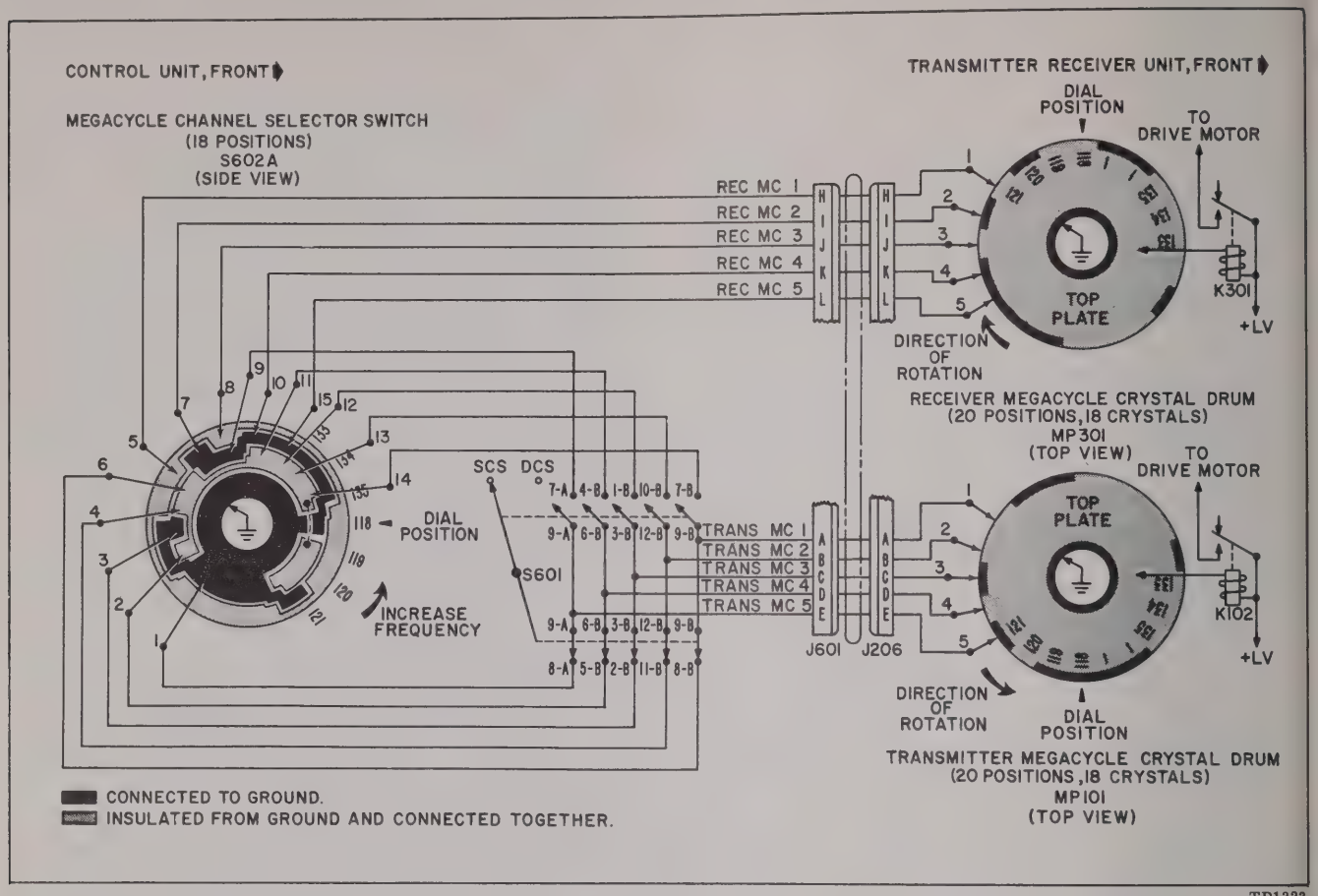
A shunt-wound motor is used in dynamotor D701 so that a fairly constant speed is maintained under varying load conditions. The 14-volt and 28-volt models of the dynamotor are similar, the exception being the input power requirements which are given in paragraph 1–2.



NOTE:
1. RESISTANCE VALUES ARE IN OHMS. MULTIPLIER: K=1,000.

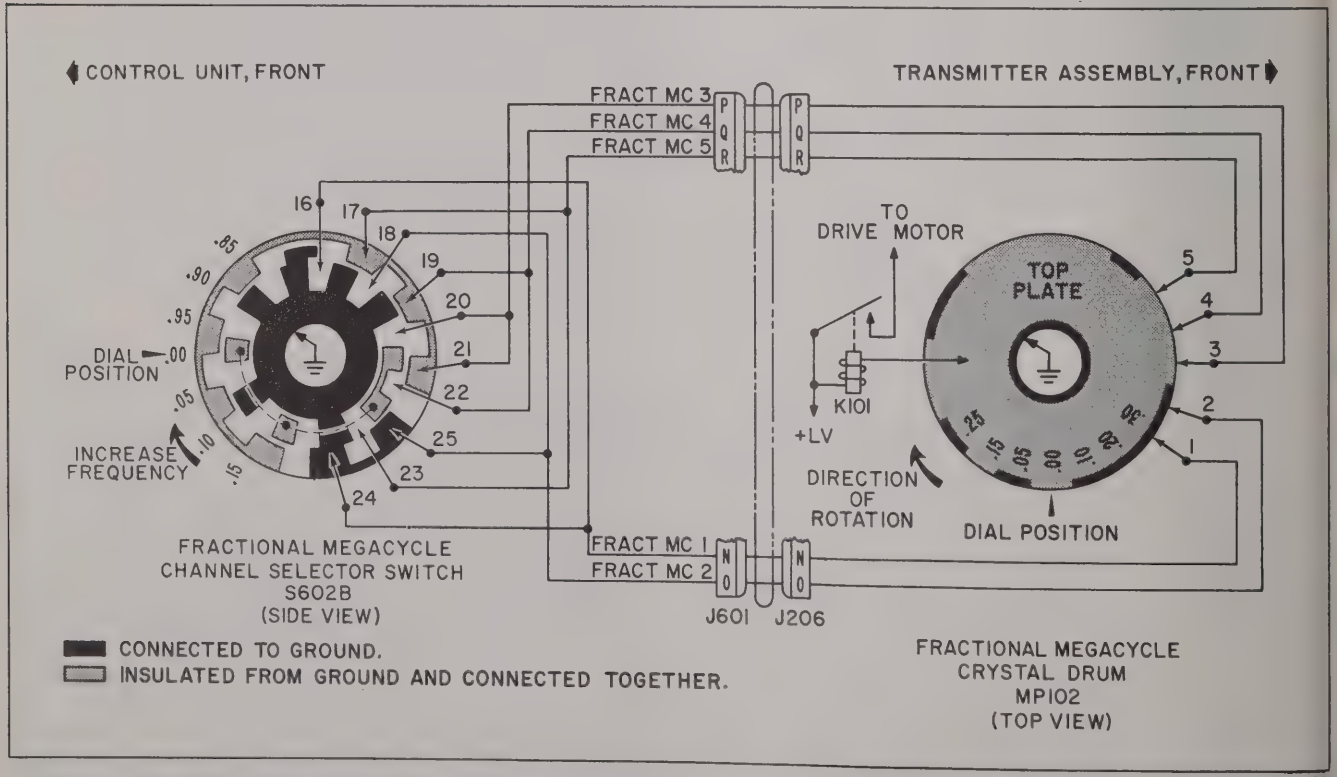
TP1321

Figure 4–18. Power Switching Circuits, Simplified Schematic Diagram



TP1323

Figure 4–19. Megacycle Channel Selector Switch Control Circuit, Simplified Schematic Diagram



TP1325

Figure 4–20. Fractional Megacycle Channel Selector Switch Control Circuit, Simplified Schematic Diagram

SECTION V

MAINTENANCE

Note

Modifications of the RT-11A Receiver-Transmitter are identified by an "M" number stamped on the bottom of the main chassis. The information contained in this section is applicable to all models, unless noted otherwise.

5–1. INTRODUCTION.

This section contains maintenance data for the ARC Type 210 VHF Communication Equipment. Included are a list of the test equipment required for maintenance; removal and replacement procedures; system performance checks; trouble analysis information; alignment and adjustment procedures; and voltage, resistance, and stage gain measurements. To help locate and identify individual parts, interior views of the units are also included in this section. Complete schematic and wiring diagrams of the units are included in Section VI.

WARNING

VOLTAGES IN THIS EQUIPMENT ARE DANGEROUS AND MAY BE FATAL IF CONTACTED. OBSERVE ALL SAFETY PRECAUTIONS.

5–2. TEST EQUIPMENT.

Table 5–1 lists the test equipment required for maintenance of the Type 210; equivalent test equipment may be substituted. Use of the ARC Type BTK-210 Bench Test Kit is recommended to facilitate performing all procedures. The BTK-210 includes an ARC Type H-22A Transceiver Test Panel and all necessary interconnecting cable assemblies for the test and alignment procedures. If a BTK-210 is not available, other test equipment, shown in Figure 5–9, is required.

5–3. REMOVAL AND REPLACEMENT PROCEDURES.

Replacement of Electron Tubes. All electron tubes used in the Type 210 are located in the RT-11A Receiver-Transmitter. With the exception of V105 and V106 in the transmitter assembly, and V401 and V402 in the modulator assembly, the electron tubes are all subminiature types. Tube location diagrams are shown in Figures 5–1 and 5–2. Wherever possible, the insulated terminals connected to subminiature tubes are color-coded in accordance with RETMA color code standards. All tubes are accessible with the removal of the dust cover. The subminiature tubes are soldered in position and mounted in individual metal tube clamps. If a subminiature tube

TABLE 5–1. TEST EQUIPMENT

Qty	Name	Designation	Characteristics
1	Bench Test Kit	ARC Type BTK-210	—
1	Vacuum Tube Voltmeter	Hewlett-Packard Model 410B	—
1	Vacuum Tube Voltmeter[1]	Ballantine Model 300	—
1	Multimeter	Simpson Model 260 or Weston Model 564	20,000 ohms/volt, or 1000 ohms/volt
1	Output Power Meter[1]	General Radio Type 583-A	20,000 ohms input impedance
1	Signal Generator	Measurements Model 65-B	Furnishes 1.7-mc and 11.7- to 12.65-mc signals
1	Signal Generator	Boonton Radio Type 211-A, with Boonton Radio Type 505-B 6-db pad and Adapter UG-349A/U	Furnishes 118.00- to 135.95-mc signals
1	RF Wattmeter	Bird Electronic Model 61	51.5 ohms, 20 watts
1	Oscilloscope[2]	—	Capable of observing r-f envelope for setting per cent modulation and clipping level. If such an oscilloscope is not available, refer to paragraph 5–11 for alternative equipment required for modulator adjustment.
1	Audio Oscillator	Hewlett-Packard Model 200AB	—
1	Power Unit	ARC Type P-15A	—
1	Low-voltage supply	—	14- or 28-volt dc rectifier or storage battery
1	Microphone	ARC-11937	Carbon, single-button
1	Loudspeaker	ARC-14601	5-inch PM, 2.75 watts
1	Tuning Wand	—	Teflon tuning wand equipped with iron and brass tips
1	Splined Socket Wrench	Bristo No. 4	—

[1] Required only when an ARC Type BTK-210 Bench Test Kit is not available.
[2] Optional equipment.

is replaced, the new tube should be oriented and its leads routed as nearly like the original installation as possible; do not precut the leads before installation, keep the spacing between leads at least $\frac{1}{16}$ inch, and use a minimum amount of solder. Wiring diagrams of the tubes showing proper orientation and lead routing are shown in Figures 6–5, 6–6, 6–7, 6–8, 6–9, 6–13, 6–15, 6–16, and 6–17.

When replacing the type 6850 power tube, V106 in the transmitter assembly or V401 in the modulator assembly, use care in installing the plate pin connectors to avoid damaging the glass-to-metal seal of the tube envelope. Also, before inserting V106, check that pins No. 2 and 6 are aligned with the grid lead connectors on XV106. The grid lead connectors "float" within two Teflon insulated bushings mounted on the dust cover for tube socket XV106.

Caution

If tubes are removed for testing, replace all tubes testing "good" in the same location from which they were removed. If new tubes are installed, check for normal performance.

Replacement of Crystal Diodes. The RT-11A contains seven crystal diodes located on the rear of the front panel, and in the receiver and modulator assemblies, as listed in Table 5–2.

All crystal diodes are soldered in position and are accessible with the removal of the RT-11A dust cover. If replacement is required, the new diode must be correctly polarized and its leads routed as nearly like the original installation as possible. The location and polarity of the diodes are shown in the wiring diagrams referenced in Table 5–2. When soldering a replacement unit, hold the diode lead with a pair of pliers between the solder joint and the diode. The pliers form a heat sink during soldering and prevent excessive heat from damaging the unit. Do not remove the pliers until the heat from the soldered joint has been dissipated.

Removal of Transmitter Assembly.

Caution

To prevent damaging the miniature components of the assembly, handle the assembly by the external framework only.

Step 1. Loosen the two captive screws holding gearing assembly A501 (see Figure 5–3) to the transmitter assembly frame, and remove the gearing assembly by gently pulling straight up.

Step 2. Disconnect P203, P204, and P205 from the transmitter tuner assembly, A102.

Step 3. Disconnect the coaxial plug, P201, from the front of the transmitter assembly.

Step 4. Disconnect the transmitter B+ plug, P202 (red wire), from the front of the transmitter assembly.

Step 5. Place the RT-11A on its right side (viewed from the front) and loosen the five captive screws which fasten the transmitter assembly to the base of the chassis.

Step 6. Turn the RT-11A back to its normal position. *Gently* pry the assembly away from the chassis partition plate with a screwdriver to free the assembly from the connectors located in the partition plate. To remove the transmitter assembly, pull the assembly directly away from the partition plate.

Replacement of Transmitter Assembly.

Step 1. Manually release the latching relay, K101, on the fractional megacycle tuner assembly and, using the indexing mechanism, rotate the crystal drum until the .95-mc position, as viewed, when installed, from the external side of the assembly, is reached.

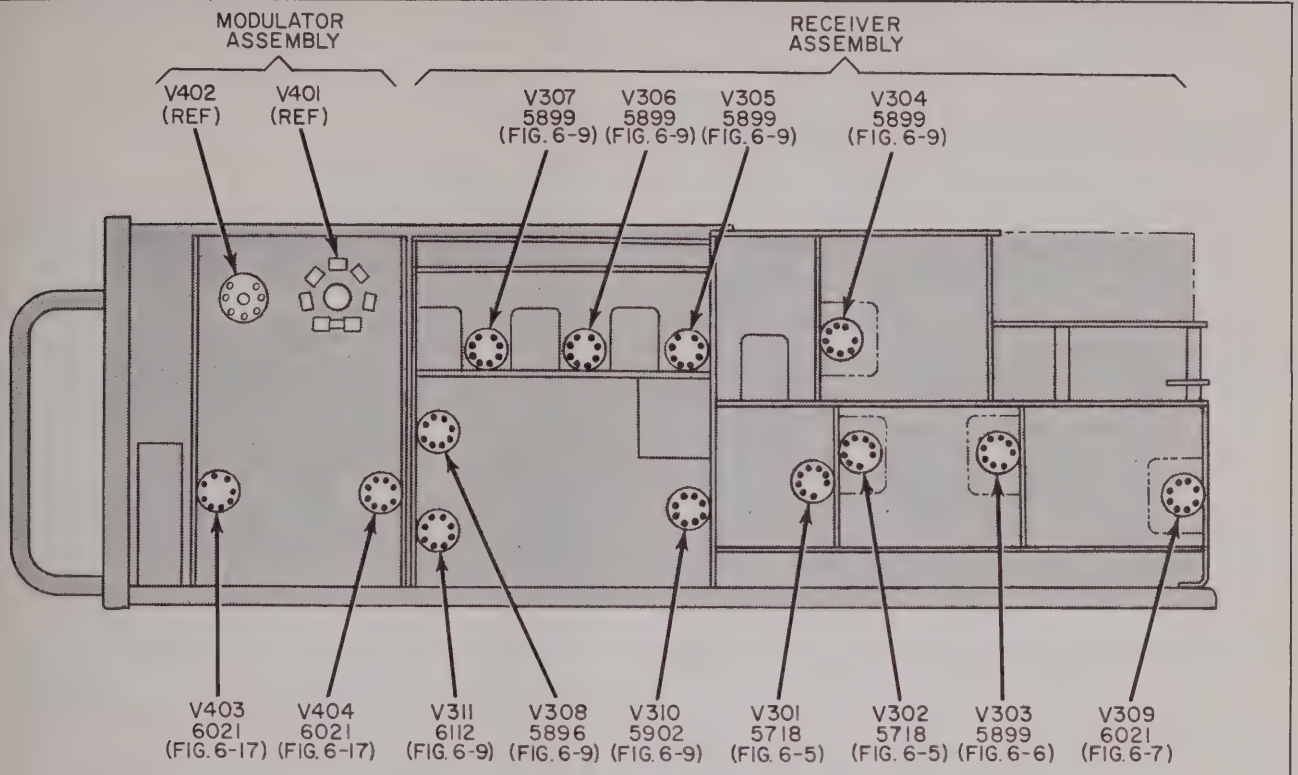
Step 2. Rotate the receiver fractional megacycle tuning gear until the cam follower falls into the notch at minimum cam radius (tuning slugs will be in fully withdrawn position).

Step 3. With the chassis in its normal position, install the transmitter assembly, A101 (see Figure 5–3), by engaging the transmitter receptacles with the mating

TABLE 5–2. LOCATION OF CRYSTAL DIODES IN RT-11A

Symbol No.	Location	Function	Wiring Diagram Figure No.
[1] CR101	Transmitter Assembly	Transient Limiter	6–14
[1] CR102	Transmitter Assembly	Transient Limiter	6–14
CR201	Front Panel	Sidetone Rectifier	6–2
[2] CR202	Front Panel	Transient Limiter	6–2A
CR301	Receiver Assembly	Sidetone Switch	6–10
CR302	Receiver Assembly	Audio Switch	6–10
CR303	Receiver Assembly	Squelch Switch	6–10
CR304	Receiver Assembly	Noise Limiter	6–10
CR305	Receiver Assembly	Agc Clamp	6–10
[1] CR306	Receiver Assembly	Transient Limiter	6–10
[1] CR307	Receiver Assembly	Transient Limiter	6–3
CR401	Modulator Assembly	Clipper Diode	6–18

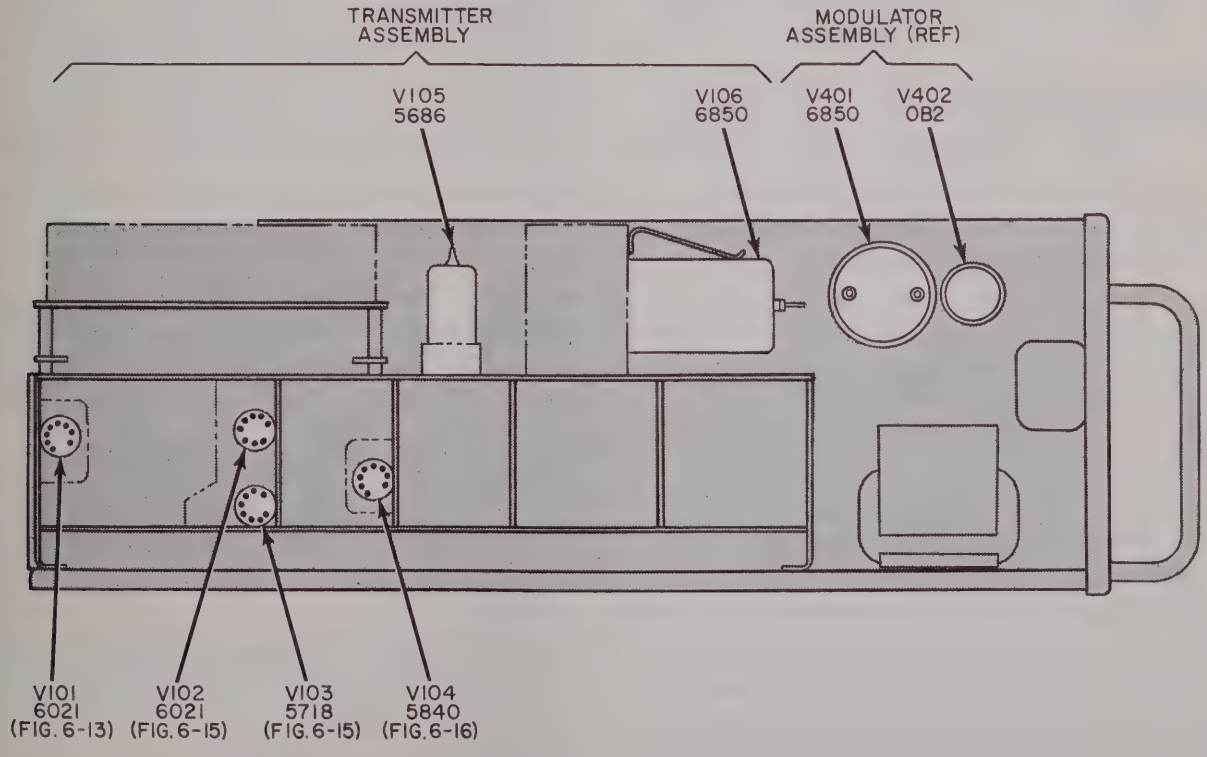
[1] Added in M-6 through M-9 units. Except for CR306, deleted in M-10 units.
[2] Replaces TY201 in M-9 and M-10 units.



NOTE: FIGURE NUMBERS IN PARENTHESES REFER TO INDIVIDUAL WIRING DIAGRAMS.

TP1327

Figure 5–1. ARC Type RT-11A Receiver-Transmitter, Receiver and Modulator Assemblies, Tube Locations



NOTE: FIGURE NUMBERS IN PARENTHESES REFER TO INDIVIDUAL WIRING DIAGRAMS.

TP1329

Figure 5–2. ARC Type RT-11A Receiver-Transmitter, Transmitter and Modulator Assemblies, Tube Locations

partition plate plugs. Check that the transmitter assembly fractional megacycle tuning gear meshes securely and correctly with the receiver assembly pinion gear.

Step 4. Place the RT-11A chassis on its right side. Secure the transmitter assembly by tightening the five captive screws on the underside of the chassis.

Step 5. Turn the RT-11A back to its normal position. Connect the transmitter B+ plug, P202 (red wire), to the receptacle at the front of the transmitter assembly.

Step 6. Connect the coaxial plug, P201, to the coaxial jack at the front of the transmitter assembly.

Step 7. Connect the five-contact plug, P205, to the front of the transmitter tuner assembly, A102.

Step 8. Connect the three-contact plug, P204, to the inside wall of the transmitter tuner assembly.

Step 9. Connect the five-contact plug, P203, to the rear of the transmitter tuner assembly.

Step 10. Prior to installation of the gearing assembly, A501, position the cams so that they will not interfere with the tuner assembly lever arms during the seating operation.

Step 11. Align the two gearing assembly mounting sleeves with the mounting posts on the transmitter tuner assembly, and install the gearing assembly by pressing it gently into position.

Step 12. Secure the gearing assembly to the transmitter assembly frame by tightening the two captive screws.

Removal of Receiver Assembly.

Caution

To prevent damaging the miniature components of the assembly, handle the assembly by the external framework only.

Step 1. Loosen the two captive screws holding the gearing assembly, A501 (see Figure 5–3), to the transmitter assembly frame, and remove the gearing assembly by gently pulling straight up.

Step 2. Disconnect P208 from the rear of the receiver tuner assembly, A302.

Step 3. Place the RT-11A on its left side (viewed from front) and disconnect the coaxial plug, P209, from the bottom of the receiver assembly.

Step 4. Loosen the four captive screws which fasten the receiver assembly to the base of the chassis.

Step 5. Turn the RT-11A back to its normal position. Loosen the captive screw which fastens the upper front corner of the receiver assembly to the partition plate of the chassis.

Step 6. Remove the receiver assembly by pulling *straight up,* using a slight rocking motion to help free the assembly from its base plug connector (take care when separating the transmitter assembly pinion drive gear from the receiver assembly fractional megacycle tuning gear).

Replacement of Receiver Assembly.

Step 1. Rotate the receiver fractional megacycle tuning gear until the cam follower falls into the notch at minimum cam radius (tuning slugs will be in fully withdrawn position).

Step 2. Check the position of the fractional megacycle crystal drum in the transmitter assembly. It must be in the .95-mc position (as viewed from the external side of the transmitter assembly). If it is not in the .95-mc position, release the latching relay, K101, on the fractional megacycle tuner assembly and, using the indexing mechanism, rotate the crystal drum until it locks in the .95-mc position.

Caution

Failure to set the transmitter fractional megacycle dial to .95 mc before installation of the receiver assembly will cause faulty tuning of the receiver.

Step 3. With the chassis in its normal position, install the receiver assembly, A301 (see Figure 5–3), by pressing downward on its base plug assembly, using a gentle rocking motion. Check that the receiver assembly pinion gear meshes securely and correctly with the transmitter assembly fractional megacycle tuning gear.

Step 4. Place the RT-11A on its left side (viewed from front) and secure the receiver assembly by tightening the four captive screws on the base of the chassis.

Step 5. Connect the coaxial plug, P209, to the coaxial jack located on the bottom of the receiver assembly.

Step 6. Turn the RT-11A back to its normal position. Tighten the captive screw which fastens the upper front corner of the receiver assembly to the partition plate of the chassis.

Step 7. Connect the five-contact plug, P208, to the rear of the receiver tuner assembly, A302.

Step 8. Prior to installation of the gear assembly, A501, position the cams so that they will not interfere with the tuner assembly lever arms during the seating operation.

Step 9. Align the two gearing assembly mounting sleeves with the mounting posts on the tuner assembly, and install the gearing assembly by pressing it gently into position.

Step 10. Secure the gearing assembly to the transmitter assembly frame by tightening the two captive screws.

Removal of Modulator Assembly.

Caution

To prevent damaging the miniature components of the assembly, handle the assembly by the external framework only.

Step 1. Disconnect the two pin connectors, P210 and P211 (blue and red leads), from the plates of the power modulator tube, V401 (see Figure 5–3).

Step 2. Remove V401.

Step 3. Disconnect coaxial plug, P207, from the antenna relay, K201.

Step 4. Remove the screen voltage regulator tube, V402.

Step 5. Place the RT-11A on its left side (viewed from front) and loosen the two captive screws which fasten the modulator assembly, A401, to the base of the chassis.

Step 6. Turn the RT-11A back to its normal position. Loosen the two captive screws which fasten the two upper corners of the modulator assembly to the partition plate of the chassis.

Step 7. Remove the modulator assembly by pulling *straight up,* using a slight rocking motion to help free the assembly from its base plug connector.

Replacement of Modulator Assembly.

Step 1. With the RT-11A in its normal position, carefully align the modulator assembly, A401 (see Figure 5–3), with its base plug assembly and install the modulator by pressing downward on its base plug assembly. Use a gentle rocking motion to help seat the unit.

Step 2. Place the RT-11A on its left side (viewed from front) and tighten the two captive screws which fasten the modulator assembly to the base of the chassis.

Step 3. Turn the RT-11A back to its normal position. Tighten the two captive screws which fasten the upper corners of the modulator assembly to the partition plate of the chassis.

Step 4. Install the screen voltage regulator tube, V402.

Step 5. Connect the coaxial plug, P207, to its jack on the antenna relay, K201.

Step 6. Install the power modulator tube, V401.

Step 7. Connect the two pin connectors, P210 and P211 (blue and red leads) to the plates of V401, as shown in Figure 5–3.

Caution

Take care when installing the plate connectors to avoid damaging the glass-to-metal seal of the tube envelope.

Replacement of Transmitter Crystals. To replace any of the transmitter megacycle or fractional megacycle crystals located in the transmitter assembly, proceed as follows:

Step 1. Loosen the two captive screws holding the gearing assembly to the transmitter assembly frame, and remove the gearing assembly by gently pulling straight up (see Figure 5–3).

Step 2. Disconnect P203, P204, and P205 from the transmitter assembly.

Step 3. Remove the four tuner assembly mounting screws, located at each corner, and the gearing assembly mounting post.

Step 4. Remove the tuner assembly, exposing the crystal drums (see Figure 5–4).

Step 5. Remove the four screws which hold the crystal clamping plate, and remove the plate.

Step 6. Using tweezers or small long nose pliers, remove the desired crystal from its socket.

Step 7. Before installing the replacement crystal, check that its frequency is correct and that its pins are straight and parallel.

Step 8. Install the replacement crystal.

Step 9. Reinstall the crystal clamping plate, checking that each crystal is correctly positioned under its segment of the clamping plate.

Step 10. Reinstall the tuner assembly. Make sure the indexing tab on each tuner switch plate assembly mates with the indexing notch located on each crystal drum.

Caution

Failure to index the crystal drum properly with the tuner assembly tab will cause improper operation.

Step 11. Reconnect P203, P204, and P205.

Step 12. Reinstall the gearing assembly.

Note

When reinstalling the gearing assembly, position the gearing assembly drive cams so that they do not interfere with the tuner assembly lever arms.

Step 13. Check the transmitter output frequency for compliance with FCC regulations.

Replacement of Receiver Crystals. To replace the receiver crystals located in the receiver assembly, proceed as follows:

Step 1. Loosen the two captive screws holding the gearing assembly to the transmitter assembly frame, and

remove the gearing assembly by gently pulling straight up (see Figure 5–3).

Step 2. Disconnect P208 from the receiver assembly.

Step 3. Remove the five tuner assembly mounting screws.

Step 4. Lift the tuner assembly, exposing the receiver megacycle crystal drum, and place the tuner assembly bottom side up on the receiver assembly frame (see Figure 5–5).

Note

It is not necessary to disconnect the blue and green flexible leads connecting the tuner assembly to the receiver assembly chassis.

Step 5. Remove the four screws which hold the crystal clamping plate on the crystal drum, and remove the crystal clamping plate.

Step 6. Using tweezers or small long nose pliers, remove the desired crystal from its socket.

Step 7. Before installing the replacement crystal, check that its frequency is correct and that its pins are straight and parallel.

Step 8. Install the replacement crystal.

Step 9. Reinstall the crystal clamping plate, checking that each crystal is correctly positioned under its segment of the clamping plate.

Step 10. Reinstall the tuner assembly. Make sure the indexing tab on the tuner assembly mates with the indexing notch on the crystal drum.

Caution

Failure to index the crystal drum properly with the tuner assembly tab will result in improper operation of the equipment.

Step 11. Reconnect P208 to the receiver assembly.

Step 12. Reinstall the gearing assembly.

Note

When reinstalling the gearing assembly, position the gearing assembly drive cams so that they do not interfere with the tuner assembly lever arms.

Replacement of Panel Lamps. The C-67A Control Unit uses either two type 327 (28-volt) or 330 (14-volt) midget flange-base panel lamps. To replace a lamp, proceed as follows:

Step 1. Unscrew and remove the lamp housing assembly.

Step 2. With the thin edge of a knife blade or the fingernails of the thumb and forefinger inserted between the flange base of the lamp and threaded bushing, withdraw the defective lamp.

Step 3. Insert a new lamp, seating the flange of the base firmly against the threaded bushing.

Step 4. Replace the lamp housing assembly, and screw in finger tight.

5–4. LUBRICATION.

The gears and bearings of the tuner assemblies and gearing assembly in the RT-11A should be lubricated in accordance with information given in Figure 5–6. The gears and bearings of the channel selector switches in the C-67A should be lubricated in accordance with information given in Figure 5–7. In the P-15A, the dynamotor bearings are lubricated for 1000 hours of operation; however, a 500-hour check of the condition of the lubricant is recommended. Remove the dynamotor, following the procedure given in paragraph 5–6. To inspect the lubricant, remove the dynamotor end covers and bearing covers at each end of the dynamotor frame. If the lubricant is dry, dirty, or insufficient, remove as much old grease as possible with a *clean* cloth or stiff brush, and add enough Andok C grease (Esso Standard Oil Co.) to cover the bearings. *Do not use substitute lubricant.* Keep dust and dirt away from grease.

Caution

Do not pack bearings or allow grease to get on commutators.

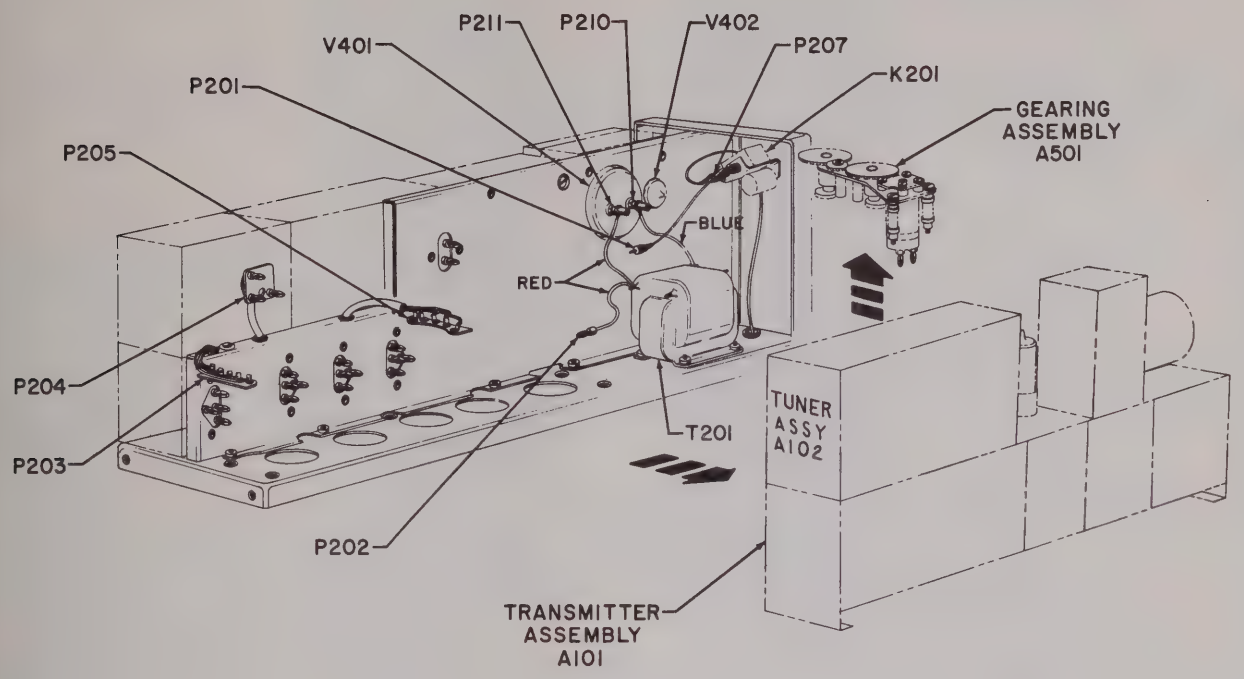
5–5. C-67A CONTROL UNIT MAINTENANCE.

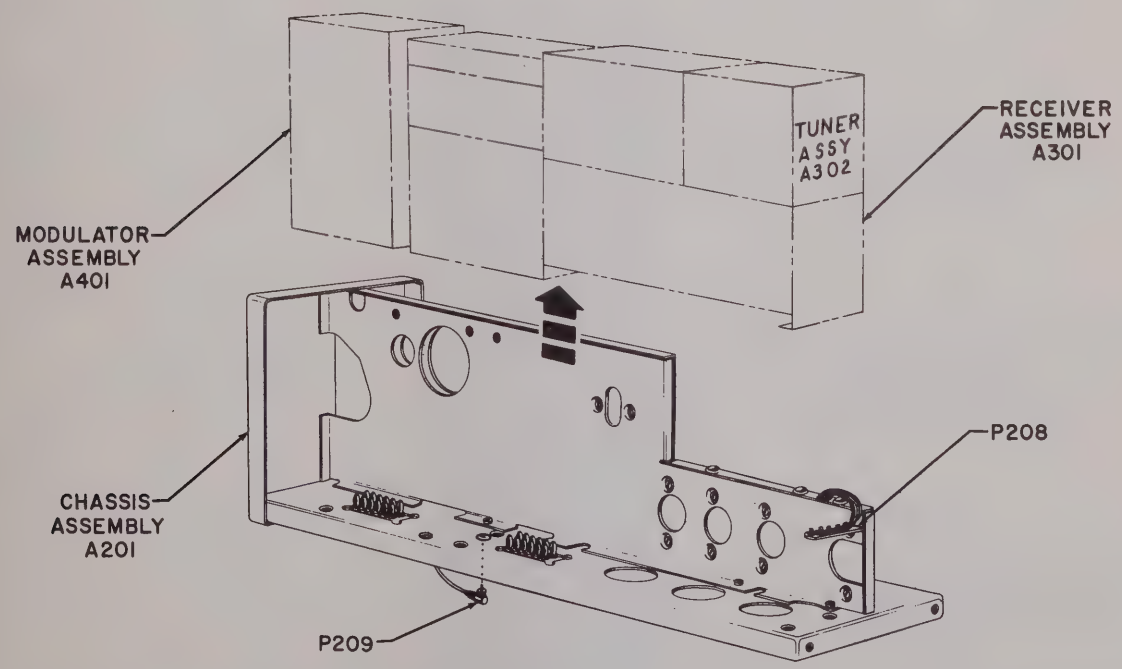
Maintenance of the C-67A Control Unit consists of visual inspection of internal connections, visual inspection of the connector pin plugs, and lubrication of the channel selector switches (paragraph 5–4). With the exception of the channel selector switch assembly, S602, all parts may be replaced in the field.

If the channel selector switch assembly becomes defective, replace the C-67A and return the defective unit to the factory for servicing.

Caution

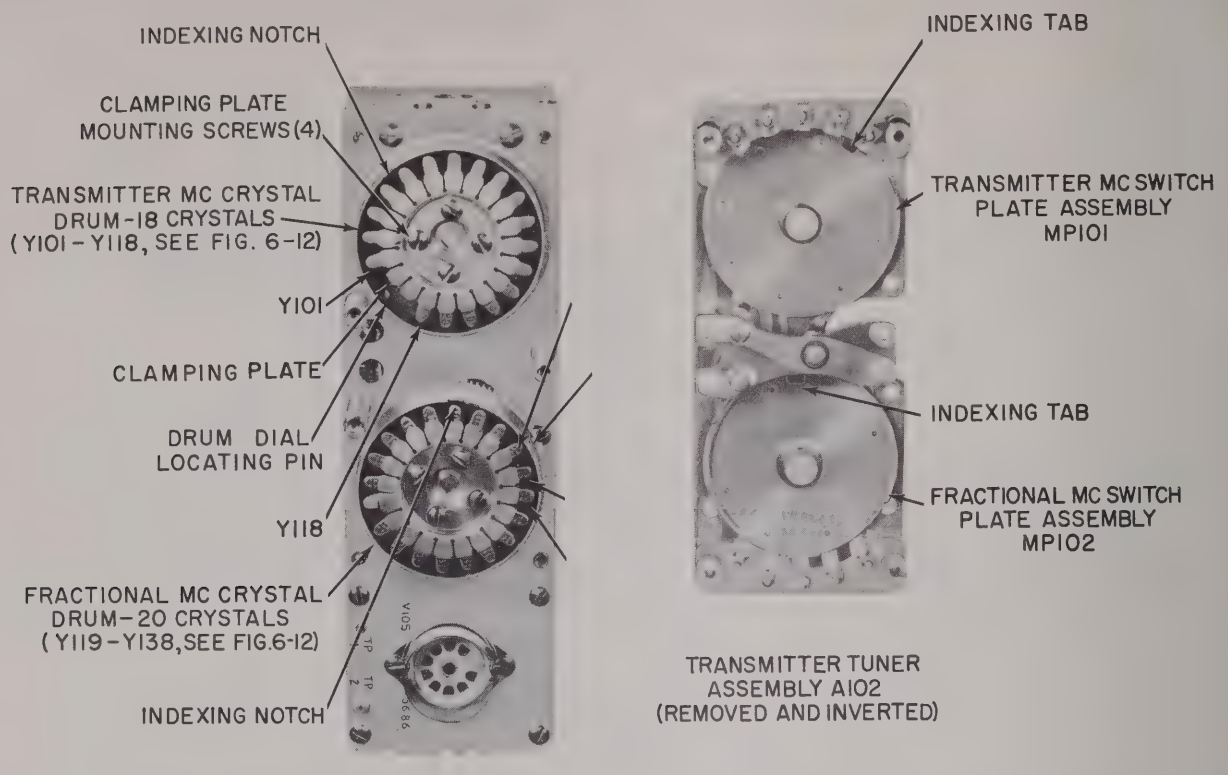
Excessive soldering iron heat applied to the terminals on the printed circuit plates of the channel selector switch assembly will affect the position and pressure of the contact springs.





TP1331

Figure 5–3. ARC Type RT-11A Receiver-Transmitter, Removal of Major Assemblies


INDEXING NOTCH
CLAMPING PLATE MOUNTING SCREWS (4)
TRANSMITTER MC CRYSTAL DRUM-18 CRYSTALS (Y101-Y118, SEE FIG. 6-12)
Y101
CLAMPING PLATE
DRUM DIAL LOCATING PIN
Y118
FRACTIONAL MC CRYSTAL DRUM-20 CRYSTALS (Y119-Y138, SEE FIG. 6-12)
INDEXING NOTCH
INDEXING TAB
TRANSMITTER MC SWITCH PLATE ASSEMBLY MP101
INDEXING TAB
FRACTIONAL MC SWITCH PLATE ASSEMBLY MP102
TRANSMITTER TUNER ASSEMBLY A102 (REMOVED AND INVERTED)

TP1186

Figure 5–4. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Tuner Assembly A102 Removed

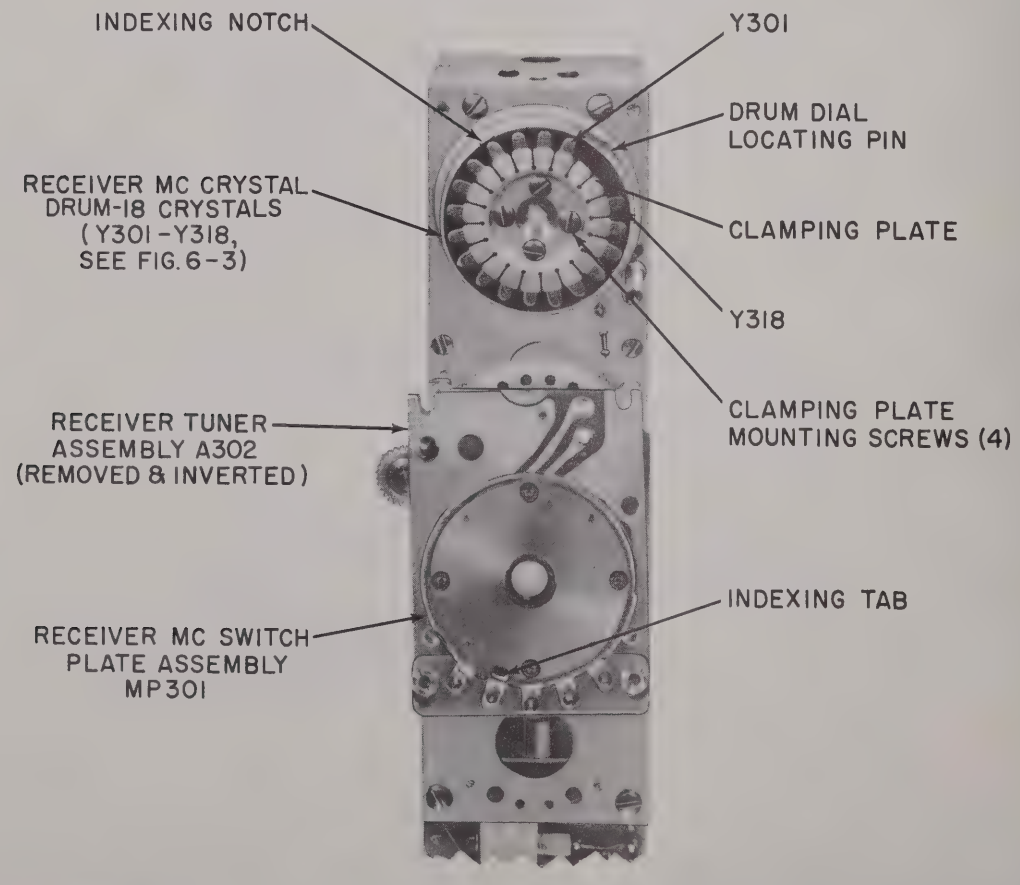


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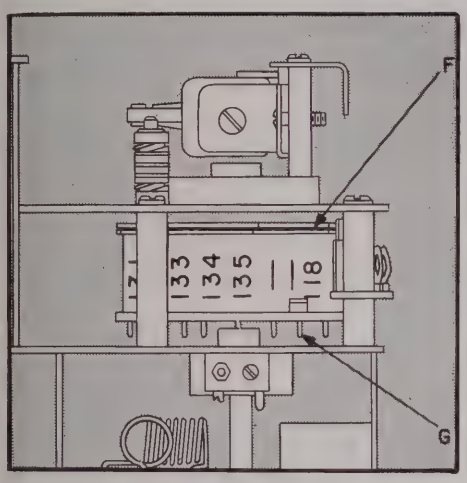
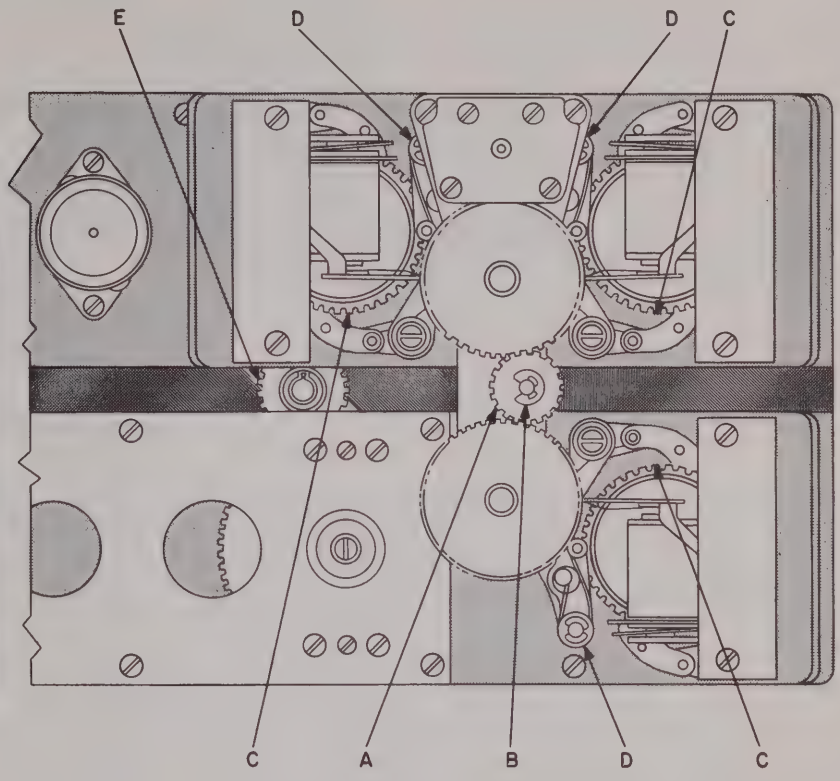
Figure 5–5. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Tuner Assembly A302 Removed



SIDE VIEW OF A
TYPICAL DRUM ASSEMBLY



TOP VIEW

Point of Lubrication	Part to be Lubricated	Lubrication Period	Kind of Lubricant	Application
A	Idler Spur Gear	500 hours	Aeroshell No. 7 Grease	Apply small amount to several gear teeth.
B	Idler Spur Gear Bearing	500 hours	Aeroshell No. 7 Grease	Apply small amount.
C	Indexing Plate Notches and Ratchet Teeth	500 hours	Aeroshell No. 7 Grease	Apply small amount to several notches and teeth of each tuner assembly.
D	Lever Arm Post Bearing	500 hours	Aeroshell No. 7 Grease	Apply small amount.
E	Idler Spur Gear	500 hours	Aeroshell No. 7 Grease	Apply small amount to several gear teeth.
F	Switch Plate Contact Surface	500 hours	Dow-Corning DC-510 Silicone Fluid	Apply small amount to several points on the switch plate contact surface of each tuner assembly with artist's brush.
G	Crystal Pins	500 hours	Dow-Corning DC-510 Silicone Fluid	Apply small amount to several crystal pins of each tuner assembly with artist's brush.

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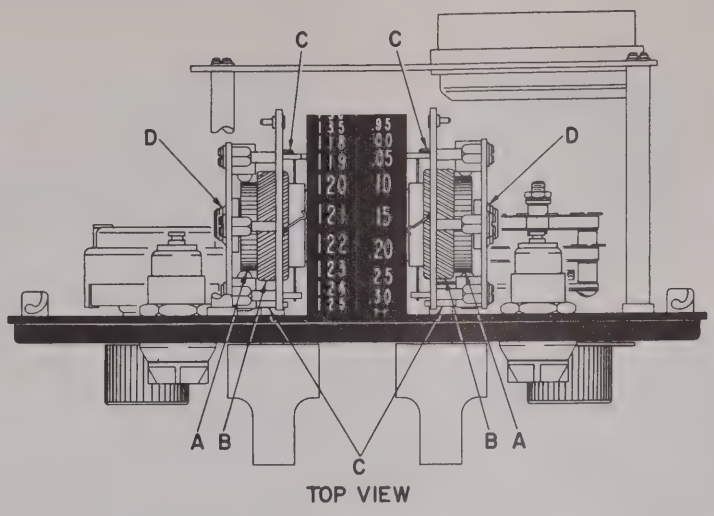
Figure 5–6. ARC Type RT-11A Receiver-Transmitter Lubrication Chart



TOP VIEW

Caution

Keep oil and grease away from spring contacts and printed circuit contact plates, otherwise intermittent operation may result.

Point of Lubrication	Part to be Lubricated	Lubrication Period	Kind of Lubricant	Application
A	Detent Gear	500 hours	Aeroshell No. 7 Grease	Apply thin coat to gear teeth with artist's brush.
B	Bevel Gear	500 hours	Aeroshell No. 7 Grease	Apply thin coat to gear teeth with artist's brush.
C	Control Shaft Bearing	500 hours	Pioneer No. 10 Oil	Invert unit and apply one drop to each bearing.
D	Drum Shaft Bearing	500 hours	Pioneer No. 10 Oil	Apply one drop to each bearing.

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Figure 5–7. ARC Type C-67A Control Unit, Lubrication Chart

5–6. P-15A POWER UNIT MAINTENANCE.

The P-15A Power Unit may be serviced in the field. Lubricate the dynamotor as described in paragraph 5–4. Inspect the brush lengths and replace, if necessary, as described in the following paragraphs.

Removal of End Covers. Every 500 hours, remove the dynamotor end covers, and clean the brushes and commutators with clean, compressed air. Proceed as follows:

Step 1. Remove the P-15A dust cover and disconnect the six dynamotor leads from the P-15A terminal board.

Step 2. Remove the four binding-head screws fastening the dynamotor to the P-15A frame and remove the dynamotor.

Step 3. To expose the low-voltage commutator and brushes, remove the four fillister-head screws from the fan-end of the dynamotor assembly and remove the end cover. Using a No. 6 Allen wrench (No. 6 Bristol wrench on later models), loosen the motor-fan setscrew and pull the motor fan from the dynamotor shaft. Remove the commutator dust cover.

Step 4. To expose the −120-volt and +340-volt commutators and brushes, remove the two fillister head screws from the opposite end of the dynamotor assembly and remove the end cover.

Brush Inspection. The normal life of the dynamotor brushes is 1000 hours. During the 500-hour check, the brushes should be removed one at a time and examined for wear as follows:

Step 1. Remove the brush cap.

Step 2. Remove the brush and, to insure correct seating during replacement, note the location of the polarity mark on the brush with respect to the holder.

Step 3. Examine the brush for wear and replace only if it is shorter than the following minimum length (measured from shoulder to end):

Low-voltage Brush — $\frac{5}{16}$ inch
−120-volt Brush — ¼ inch
+340-volt Brush — ¼ inch

Step 4. If the brush is reusable, check the relative location of the polarity mark (Step 2) and replace the brush in its holder.

Step 5. Replace the brush cap.

Brush Replacement.

Step 1. Sand the commutator with grade 0000, or finer, sandpaper. Clean the commutator with a dry-cleaning solvent, such as Varsol, and a clean, lintless cloth or bristle brush.

Caution

Do not use emery or aluminum oxide paper to sand the commutator.

Step 2. To check that the new brush fits properly, slide it into the brush holder and seat it firmly in position with the cap.

Step 3. Remove the new brush and fasten a close-fitting strip of grade 0000 sandpaper around the commutator. Reseat the brush in its holder so that the face bears against the sandpaper. Rotate the motor shaft by hand until the brush face assumes the proper shape.

Step 4. Remove the sandpaper and blow out all accumulated dust with clean, compressed air.

Step 5. Run the dynamotor electrically until 80 per cent of the brush face makes contact with the commutator.

5–7. SYSTEM PERFORMANCE CHECKS.

General. Table 5–3 outlines procedures for checking the performance characteristics of the Type 210. The test equipment required is listed in Table 5–1. Two optional bench test set-ups may be used for performing these tests: the bench test set-up using an ARC Type BTK-210 Bench Test Kit is shown in Figure 5–8; the bench test set-up without the use of an ARC Type BTK-210 Bench Test Kit is shown in Figure 5–9.

Test Conditions. The following test conditions are used, unless specified otherwise:

Input voltage: 13.75 volts dc (for 14-volt models) or 27.5 volts dc (for 28-volt models), as measured on the test set-up voltmeter.

Audio output termination: 300 ohms non-inductive, provided in the BTK-210 and required in the test set-up without BTK-210 (see Figure 5–9). (Parallel loads, such as a headset, must not be connected to the TEL jack on the RT-11A front panel or to the PHONE jack on the BTK-210 during audio output measurements.)

Audio input: Audio oscillator coupled to audio input through a d-c blocking capacitor which is provided in the BTK-210 and required in the test set-up without BTK-210 (see Figure 5–9).

Transmitter load: During all transmitter testing, a 52-ohm dummy load must be connected to the RT-11A ANT jack.

Signal generator output: The method of connecting the receiver to the signal generator must be carefully considered to insure proper interpretation of results. All signal generator output microvolt values given in the following procedures are in terms of "hard" microvolts.[1] When using the Boonton Radio Corp. Type 505-B 6-db pad, as shown in Figures 5–8 and 5–9, the attenuator dial of the signal generator reads "hard" microvolts directly. If the signal generator output is connected to a receiver with a 53-ohm input impedance, without the use of the 6-db pad, the attenuator dial reading must be doubled to give the correct "hard"-microvolt reading.

Warm-up: Before making any measurements, allow the equipment to warm up for at least 5 minutes.

[1] "Hard" microvolts are defined as equivalent open-circuit microvolts across a 50-ohm signal source.

TABLE 5–3. SYSTEM PERFORMANCE CHECKS

Step	Procedure With BTK-210	Procedure Without BTK-210	Normal Indication
	PRELIMINARY PROCEDURE		
1	Set LV POWER switch OFF, POWER RELAY switch OFF, TRANS KEY switch OFF, PA PLATE switch OFF, SCS-DCS switch to SCS, and SQUELCH control OFF (full counterclockwise). Set RT-11A SQUELCH control full counterclockwise and SIDETONE control full clockwise.	Set TRANS KEY switch OFF and PA PLATE switch OFF. Set C-67A VOL-OFF control OFF (full counterclockwise). Set RT-11A SQUELCH control full counterclockwise and SIDETONE control full clockwise.	None.
2	Interconnect equipment as shown in Figure 5–8. **Caution** **R-f wattmeter and cable between R/T connector on test panel and ANT connector on RT-11A must be connected, otherwise V106 in the RT-11A will be damaged during the transmit condition.**	Interconnect equipment as shown in Figure 5–9. **Caution** **R-f wattmeter must be connected to RT-11A ANT connector, otherwise V106 in the RT-11A will be damaged during the transmit condition.**	None.

TABLE 5–3. SYSTEM PERFORMANCE CHECKS — Continued

Step	Procedure With BTK-210	Procedure Without BTK-210	Normal Indication
	PRELIMINARY PROCEDURE—Continued		
3	Set d-c meter switch to LV 0-40V. Set LV POWER switch ON. Apply primary power by setting POWER RELAY switch ON, or if C-67A is connected, turn C-67A VOL-OFF control clockwise.	Apply primary power by turning C-67A VOL-OFF control clockwise.	None.
4	Adjust primary power supply to 13.75 or 27.5 volts dc, as read on d-c meter, depending on voltage rating of equipment. Allow equipment to warm up for approximately 5 minutes.	Same as with BTK-210.	Meter reads as noted and P-15A dynamotor runs.
	CHANNELING PERFORMANCE		
1	Perform the preliminary procedure outlined previously in this table.	Same as with BTK-210.	None.
2	Operate the megacycle channel selector switch to select each megacycle channel, and then the fractional megacycle channel selector switch to select each fractional megacycle channel, and observe the RT-11A crystal drums for correct positioning.	Same as with BTK-210.	Crystal drums index to selected frequency.
3	Set SCS-DCS switch to DCS. Operate the megacycle channel selector switch to select each megacycle channel from 118 mc to 129 mc and observe position of transmitter megacycle crystal drum for each frequency setting.	Same as with BTK-210.	Crystal drum indexes to exactly 6.0 mc above selected frequency.
4	Set SCS-DCS switch to SCS. Adjust primary power supply to 10.0 volts dc for 14-volt equipment or 20.0 volts dc for 28-volt equipment, as indicated on d-c meter, and repeat Step 2.	Same as with BTK-210.	As noted in Step 2.
5	Readjust primary power supply to 13.75 volts dc or 27.5 volts dc, as required.	Same as with BTK-210.	Meter reads as noted.
	RECEIVER SENSITIVITY		
1	Perform the preliminary procedure outlined previously in this table.	Same as with BTK-210, except connect Boonton Radio Type 211-A Signal Generator in place of r-f wattmeter to ANT jack of RT-11A.	None.
2	Turn the Boonton Radio Type 211-A Signal Generator on. **Note** The H-22A Transceiver Test Panel of the BTK-210 is equipped with a protective relay which transfers the ANT connector cable connection of the RT-11A from the signal generator to the r-f wattmeter when the TRANS KEY is operated.	Same as with BTK-210. **Caution** Never set the TRANS KEY switch ON with the signal generator connected, as the internal impedance resistor in the signal generator will be damaged.	None.
3	Set a-c meter switch to AUDIO OUT 0-10V, AUDIO switch to REC.	Connect Ballantine Model 300 Voltmeter, or equivalent, to AUDIO OUTPUT terminals. Set AUDIO OUTPUT-PHONE switch to AUDIO OUTPUT and SIDETONE-REC switch to REC.	None.
4	Set channel selector switches to 135.50 mc. Set signal generator attenuator dial to 2.0 μv and adjust internal 1000-cps modulation to 30% modulation. Tune signal generator to 135.50 mc as indicated by maximum valley output[1] on	Same as with BTK-210.	As noted.

TABLE 5–3. SYSTEM PERFORMANCE CHECKS — Continued

Step	Procedure With BTK-210	Procedure Without BTK-210	Normal Indication
	RECEIVER SENSITIVITY—Continued		
4 (cont.)	a-c meter, and adjust VOL control, or VOL-OFF control if C-67A is connected, for a 5.0-volt reading on a-c meter. Remove 1000-cps modulation and note drop in output on a-c meter. Drop in output in db is S+N/N ratio.		
5	Reduce signal generator input and increase VOL (or VOL-OFF) control to maintain 5.0-volt output, with modulation, until audio output drops to 2.5 volts with modulation removed. Signal generator output in microvolts is sensitivity for a 6-db S+N/N ratio.	Same as with BTK-210.	Less than 2.0 μv for a 6-db S+N/N ratio.
6	Repeat Steps 4 and 5 for 135.00, 135.95, 118.00, 118.50, 118.95, 126.00, 126.50, and 126.95 mc.	Same as with BTK-210.	As noted in Steps 4 and 5.
7	Turn off signal generator.	Turn off signal generator. Disconnect signal generator from RT-11A ANT connector and reconnect r-f wattmeter.	None.
	TRANSMITTER POWER OUTPUT		
1	Perform the preliminary procedure outlined previously in this table.	Same as with BTK-210.	None.
2	Set channel selector switches to 135.50 mc. Set PA PLATE switch ON and TRANS KEY switch ON. Read unmodulated power output on r-f wattmeter.	Same as with BTK-210.	Between 12 and 18 watts.
3	Repeat Step 2 for all settings of the megacycle channel selector switch, and then for all settings of the fractional megacycle channel selector switch.	Same as with BTK-210.	As noted in Step 2.
	MODULATOR PERFORMANCE		
1	Perform the preliminary procedure outlined previously in this table.	Same as with BTK-210.	As noted.
2	Turn Hewlett-Packard Model 200AB Audio Oscillator on. Set a-c meter switch to AUDIO IN 0-2V. Adjust audio oscillator to 1000 cps and an output of 1.0 volt as read on a-c meter.	Turn Hewlett-Packard Model 200AB Audio Oscillator on. Set AUDIO INPUT-MIC switch to AUDIO INPUT. Connect Ballantine Model 300 Voltmeter to AUDIO INPUT terminals. Adjust audio oscillator to 1000 cps and an output of 1.0 volt as read on Model 300.	None.
3	Remove audio load (headset or loudspeaker) from PHONE jack. Set a-c meter switch to AUDIO OUT 0-10V and AUDIO switch to SIDETONE. Set channel selector switches to 126.50 mc. Set PA PLATE switch ON and TRANS KEY switch ON. Read sidetone voltage on a-c meter.	Set General Radio Type 583-A Output Power Meter, connected to AUDIO OUTPUT terminals, to read 500 mw full scale for 20,000 ohms impedance. Set AUDIO OUTPUT-PHONE switch to AUDIO OUTPUT and SIDETONE REC switch to SIDETONE. Set channel selector switches to 126.50 mc. Set PA PLATE switch ON and TRANS KEY switch on. Read sidetone voltage on power output meter.	Meter indicates at least 3.87 volts (50 mw).

Since the 1.7-mc i-f transformers in the RT-11A are overcoupled, the peak audio output is the valley between the two output peaks.

5–8. TROUBLE ANALYSIS.

General. The isolation of trouble requires a systematic method of localizing the trouble, first to the unit in which the trouble exists, then to a particular stage or functionally related group of stages, and finally to the defective part or parts. System trouble-shooting, based on the normal operational procedure, will often help to determine which unit is at fault. An effective stage-by-stage test can then be made by signal tracing to isolate the faulty stage; sensitivity testing can also help to identify the stage. When the trouble has been traced to a particular stage, the faulty part or group of parts causing the trouble may be isolated and identified by a detailed trouble-shooting procedure which may include tube testing, voltage and resistance measurements, and finally, repair or replacement of the defective part.

Trouble-shooting Chart. Table 5–4 lists the symptoms of some possible troubles, their probable causes, and the suggested remedies or checks. The use of this table will help to localize the source of trouble, following which a point-by-point analysis may be made to determine the faulty part. To assist further in localizing trouble, reference should be made to the circuit theory discussion in Section IV and to the schematic diagrams in Section VI.

TABLE 5–4. TROUBLE-SHOOTING CHART

Symptom	*Probable Trouble*	*Remedy or Check*
	RT-11A RECEIVER ASSEMBLY	
Tuner runs continuously or fails to channel properly.	Defective C-67A Control Unit.	Substitute other C-67A and recheck operation. If C-67A defective, bench test and trouble-shoot to isolate defect.
	Fault in channeling circuit.	Refer to *Channeling Trouble Analysis* following this table.
Tuner drive motor fails to run.	Defective tuner relay K301.	Check operation of K301. Replace if defective.
	Inoperative drive motor B501.	Check operation of B501 in gearing unit A501.
Tuner motor runs and ratchet arms operate but crystal drum does not rotate.	Binding or abnormal loading of crystal drum and cam shaft.	Inspect crystal drum and cam shaft mechanism for binding or overload condition.
	Improper adjustment of tuner mechanism.	Refer to paragraph 5–12 for tuner adjustment.
Receiver sensitivity weak (low audio output or unsatisfactory signal-to-noise ratio).	Improper meshing of tunable i-f filter cam shaft gear with fractional megacycle crystal drum.	Refer to Step 2 of *Replacement of Receiver Assembly* in paragraph 5–3 for adjustment procedure.
	Low audio output.	Check stage gain from grid of V303 through audio amplifier section. Refer to Tables 5–9 and 5–10.
	Defect in r-f amplifier circuit or defective antenna cable.	Check continuity of antenna cable. Make r-f gain measurements of Table 5–10 to isolate fault.
No audio output.	SQUELCH control R211 or maximum squelch limit control R218 improperly adjusted or defective.	Disable squelch circuit by setting SQUELCH control full counterclockwise. If audio output or receiver noise now present, recheck adjustment of R211 and R218 (refer to *Squelch Maximum Limit Control* in paragraph 5–12). Measure resistance of R211 and R218, and replace if defective.
	Fault in receiver megacycle and fractional megacycle circuits.	Measure r-f voltage as listed in Table 5–9 and compare.
	Defect in audio circuits.	Make receiver stage gain measurements as listed in Table 5–10 and audio voltage measurements listed in Table 5–9 and compare to isolate trouble.
Squelch will not mute receiver background noise or open with strong r-f signal.	SQUELCH control R211 and maximum limit squelch control R218 improperly adjusted or defective.	Readjust squelch circuit as described in *Squelch Maximum Limit Control* of paragraph 5–12. Measure resistance and check operation of controls; replace if defective.

TABLE 5–4. TROUBLE-SHOOTING CHART — Continued

Symptom	Probable Trouble	Remedy or Check
	RT-11A RECEIVER ASSEMBLY—Continued	
Agc circuit inoperative; audio output increases excessively with increase in r-f signal.	Faulty component in agc circuit.	Make operational check of agc circuit as described in *Automatic Gain Control* of paragraph 5–12. If abnormal, measure agc control voltage at junction of R337 and C369. With no r-f input, voltage should be approximately +0.5 volt dc. With increasing r-f input, voltage should increase negatively to a maximum of approximately −9 volts dc. Also check for same voltage under same conditions at agc feed points to V301, V303, V305, and V306.
Receiver output noisy during channeling.	Improper muting voltage.	During channeling check d-c voltage at junction of R350 and R351 with vtvm. Voltage should be approximately 4 volts dc for 28-volt units and 2 volts dc for 14-volt units.
Excessive hum in audio output.	Defective filter capacitors in P-15A or audio output cathode bypass capacitor.	Check condition of C701, C702, C703, and C704 in P-15A, and C359 in cathode circuit of V310.
	RT-11A TRANSMITTER AND MODULATOR ASSEMBLIES	
Tuner runs continuously or fails to channel properly.	Defective C-67A Control Unit.	Substitute other C-67A and recheck operation. If C-67A defective, bench test and trouble-shoot to isolate defect.
	Fault in channeling circuit.	Refer to *Channeling Trouble Analysis* following this table.
Tuner drive motor fails to run.	Defective tuner relay K101 or K102.	Check operation of K101 and K102. Replace if defective.
Tuner motor runs and ratchet arms operate but crystal drum does not rotate.	Binding or abnormal loading of crystal drum and cam shaft.	Inspect crystal drum and cam shaft mechanism for binding or overload condition.
	Improper adjustment of tuner mechanism.	Refer to *Tuner Assembly Adjustments* of paragraph 5–10 for tuner adjustment.
Low or no power output.	Defective power amplifier tube V106.	Replace V106.
	Defective antenna relay K201.	Check operation of K201. Replace if defective.
	Improper alignment.	Check power output as described in *Transmitter Power Output* in Table 5–3. If power output is low on some frequencies but normal on others, realign as described in paragraph 5–10.
	Faulty oscillator outputs.	If power output is low on all frequencies, check megacycle and fractional megacycle oscillator outputs and transmitter test point voltages and compare with values listed in Table 5–9.
Low or no sidetone output.	Modulator and sidetone circuit improperly adjusted.	Adjust modulator and sidetone circuit. Refer to paragraph 5–11. If modulation is normal but sidetone output is low, measure a-f voltage at junction of C201 and C202 with 90% modulation; voltage should be approximately 1 volt ac. If voltage very low, replace sidetone diode CR201. If voltage is normal, signal trace from junction of C201 and C202 to pin 1 of V310 to isolate trouble.
Low or no modulation.	Improper adjustment of modulator.	Readjust modulator as described in paragraph 5–11. If modulator cannot be adjusted properly, or if no modulation can be observed, check modulator stage levels and compare with values listed in Table 5–9 to isolate trouble.

TABLE 5–4. TROUBLE-SHOOTING CHART — Continued

Symptom	Probable Trouble	Remedy or Check
	C-67A CONTROL UNIT	
Improper channel selection in SCS or DCS mode of operation.	Defective RT-11A.	Substitute other RT-11A and recheck operation. If RT-11A defective, bench test and trouble-shoot to isolate defect.
	Fault in channeling circuit.	Refer to *Channeling Trouble Analysis* following this table.
Dynamotor fails to start when VOL-OFF control is turned on.	Defective P-15A.	Substitute other P-15A and recheck operation. If P-15A defective, bench test and trouble-shoot to isolate defect.
	S603 of VOL-OFF control defective.	Replace VOL-OFF control.
	P-15A POWER UNIT	
Dynamotor runs but system performance not satisfactory.	Defective RT-11A.	Substitute other RT-11A and recheck operation. If RT-11A defective, bench test and trouble-shoot to isolate defect.
	Incorrect output voltages.	Measure and compare voltages with those listed in Table 5–6 to isolate trouble.
	Open or shorted dynamotor output windings.	Check continuity of dynamotor output windings.
	Defective dynamotor high-voltage brushes.	Inspect and check condition of high-voltage brushes. Refer to paragraph 5–6.
Dynamotor fails to start when primary power is applied.	Defective dynamotor starting relay K701.	Check operation of K701. Replace if defective.
	Open or shorted dynamotor input windings.	Check continuity of dynamotor input windings.
	Defective dynamotor low-voltage brushes.	Inspect and check condition of low-voltage brushes. Refer to paragraph 5–6.

Channeling Trouble Analysis. In case of improper channel selection, the following procedures will aid in localizing the trouble. One procedure is based on a test set-up using the ARC Type BTK-210 Bench Test Kit; the other uses normally available test equipment.

CHANNELING TROUBLE ANALYSIS WITH BTK-210. Interconnect the equipment and BTK-210 as shown in Figure 5-8 and perform the preliminary procedure of Table 5–3. If the trouble is in the megacycle portion of the channeling circuit during SCS operation, set the H-22A SCS-DCS switch to SCS. Operate the megacycle channel selector switch to select all megacycle channels and observe the TRANS CYCLING and REC CYCLING panel lamps on the H-22A. Compare with the lamp indications listed for SCS operation in Table 5–5.

If the trouble is in the megacycle portion of the channeling circuit during DCS operation, set the H-22A SCS-DCS switch to the DCS position. Repeat the procedure of selecting all megacycle channels and compare with the lamp indications listed for DCS operation in Table 5–5.

If the trouble is in the fractional megacycle portion of the channeling circuit, operate the fractional megacycle channel selector switch to select all fractional megacycle channels, and observe the FRACT CYCLING panel lamps on the H-22A. Compare with the lamp indications listed in Table 5–5.

If a fault is indicated by the lamps, determine if the fault is in the C-67A channel selector switches or in the RT-11A tuner assemblies by substituting other units. If substitute units are not available, disconnect the C-67A and RT-11A and make the continuity checks listed in Figure 6–21.

CHANNELING TROUBLE ANALYSIS WITHOUT BTK-21. Interconnect the units of the Type 210 and the test equipment as shown in Figure 5–9, and perform the preliminary procedure of Table 5–3. Operate the channel selector switches to select all megacycle channels and all fractional megacycle channels, for both SCS and DCS operation, and observe the RT-11A crystal drums for correct positioning.

f a fault is indicated, substitute a C-67A and then an RT-11A for the units installed to isolate the defective unit. If substitute units are not available, disconnect the C-67A and RT-11A and make the continuity checks listed in Figure 6–21.

P-15A Trouble Analysis. A fault in the P-15A may be isolated with a test set-up using the ARC Type BTK-210 Bench Test Kit, or with a test set-up using normally available test equipment.

If a BTK-210 test set-up is used, interconnect the equipment as shown in Figure 5–8 and perform the preliminary procedure of Table 5–3. Set the SCS-DCS switch to SCS and the channel selector switches to 135.00 mc. Check that the BTK-210 PA PLATE and TRANS KEY switches are OFF. Using the BTK-210 d-c meter, check the P-15A voltages and currents for the RT-11A in the receive condition and compare with the values listed in Table 5–6. Set the PA PLATE switch and the TRANS KEY switch ON, and check and compare the P-15A voltages and currents for the RT-11A in the transmit condition.

If a test set-up without a BTK-210 is used, interconnect the equipment as shown in Figure 5–9 and perform the preliminary procedure of Table 5–3. Set the C-67A SCS-DCS switch to SCS and the channel selector switches to 135.00 mc. Check that the test system PA PLATE switch and TRANS KEY switch are OFF. Using a Simpson Model 260 Multimeter or a Weston Model 564 Multimeter, check the P-15A voltages for the RT-11A, in the receive condition, at the terminals of J701 and J702, and compare with the values listed in Table 5–6. Set the PA PLATE switch and the TRANS KEY switch ON. Check and compare the P-15A voltages for the RT-11A in the transmit condition.

5–9. GENERAL ALIGNMENT AND ADJUSTMENT INFORMATION.

Paragraphs 5–10, 5–11, and 5–12 describe the alignment and adjustment procedures for the transmitter, modulator, and receiver circuits of the RT-11A. The test equipment required for the procedures is listed in Table 5–1. The bench test set-up using an ARC Type BTK-210 Bench Test Kit is shown in Figure 5–8 and the bench test set-up without a BTK-210 is shown in Figure 5–9. The standard test conditions described in paragraph 5–7 are applicable.

5–10. TRANSMITTER ALIGNMENT AND ADJUSTMENT.

Note

The preliminary procedure outlined in Table 5–3 must be completed before any of the following alignment and adjustment procedures is begun.

Fractional Megacycle Oscillator.

Step 1. Connect r-f probe of Hewlett-Packard Model 410B Voltmeter to pin 2 of V304 in receiver assembly and ground lead to RT-11A chassis. Set vtvm to read 3 volts ac full scale.

TABLE 5–5. BTK-210 LAMP INDICATIONS FOR CONTINUITY CHECKS OF CHANNEL SELECTOR SWITCHES

Switch Position	MEGACYCLE CHANNEL			FRACTIONAL MEGACYCLE CHANNEL	
	TRANS CYCLING Lamps		REC CYCLING Lamps	Switch Position	FRACT CYCLING Lamps
	SCS	DCS	SCS or DCS		
118	C, E	E	H, I, K	.00	N, O
119	A, D	A	H, I, J, L	.05	N, O, P
120	A, B, E	B	H, I, J, K	.10	N, R
121	B, C	C	I, J, K, L	.15	N, O, P, Q
122	C, D	D	J, K, L	.20	Q
123	D, E	A, E	K, L	.25	O, P, Q, R
124	E	A, B	H, L	.30	P
125	A	A, B, C	I	.35	N, P, Q, R
126	B	A, B, C, D	J	.40	O
127	C	B, C, D, E	K	.45	O, Q, R
128	D	A, C, D, E	L	.50	N
129	A, E	B, D, E	H	.55	N, P, R
130	A, B	C, E	H, I	.60	R
131	A, B, C	A, D	I, J	.65	O, Q
132	A, B, C, D	A, B, E	J, K	.70	Q, R
133	B, C, D, E	B, C	H, K, L	.75	P, R
134	A, C, D, E	C, D	I, L	.80	P, Q
135	B, D, E	D, E	H, J	.85	N, Q
				.90	O, P
				.95	N, O, R

Note: Letters refer to illuminated lamps only. Letters also indicate grounded control wire terminals of J601 in C-67A and J206 in RT-11A.

Step 2. Set fractional megacycle dial on control unit successively from .00 mc to .95 mc and observe voltages indicated on vtvm. Output voltage should be 0.9 volt or greater for each setting, indicating proper operation of the fractional megacycle oscillator and the individual crystals.

Megacycle Oscillator Doubler.

Step 1. Check that PA PLATE switch is in OFF position. Set TRANS KEY switch ON. Adjust primary voltage to 27.5 volts or 13.75 volts, as applicable, and set channel selector switches on control unit to 135.50 mc.

Step 2. Set the Model 410B vtvm to read 3 volts ac full scale. Connect r-f probe to high side of transmitter doubler coil L102. Adjust trimmer capacitor C106, located on rear bulkhead of transmitter (see Figure 5–10), for a maximum reading on vtvm.

Note

The oscillator-doubler plate capacitor, C107A-C107B is factory adjusted and locked. Since its adjustment is not critical, it is not disturbed during normal alignment procedures.

Step 3. Set megacycle channel selector switch on the control unit successively from 118 mc to 135 mc and note that doubler output voltage is present on all channels, as indicated on the vtvm. Presence of this voltage indicates that all megacycle crystals are functioning.

Note

The voltage observed on the vtvm for each channel is not the true doubler output voltage due to the detuning effect of the vtvm r-f probe.

Mixer and R-f Amplifier.

Step 1. Set the Model 410B vtvm to read −10 volts dc full scale. Connect d-c probe to transmitter test point TP3, located on front side of V106 socket assembly (see Figure 5–10). Set channel selector switches on control unit to 135.50 mc.

Step 2. Using a No. 4 Bristo wrench, loosen setscrews in tuning arms of mixer plate capaciter C118, r-f amplifier plate capacitor C129, r-f driver plate capacitor C134, and r-f power amplifier plate capacitor C143 (see Figure 5–10).

Step 3. Tune C118, C129, and C134 by means of the screwdriver slots in ends of capacitor shafts (see Figure 5–10) for a maximum reading on vtvm. Note that each rotor section of split-stator capacitors C118, C129, and C134 is not beyond the minimum capacity position and that the capacity will increase when the capacitors are rotated in a counterclockwise direction, as viewed from the shaft end.

Step 4. Use tuning wand on tank coils L110, L113, and L115 to determine if optimum peaking has been achieved. If optimum peaking is not obtained on any coil with minimum or greater capacity, increase coil-turn spacing with an insulated tool until optimum peaking is obtained. Tighten the setscrews in tuning arms of C118 and C129. The vtvm reading should be approximately −6 volts.

Step 5. Throw PA PLATE switch ON. Tune C134 and C143 by means of their slotted shafts for a maximum reading on the r-f wattmeter.

Step 6. To neutralize the power amplifier: Set PA PLATE switch OFF. Set vtvm to read 1.0 volt ac full scale and connect r-f probe to the transmitter output connector, J105. Neutralizing capacity is adjusted by bending extended wires or terminal tabs on stators of power amplifier capacitor C143 (see Figure 5–10) to vary the capacity between the stators of C134 and the stators of C143. Adjust cross neutralization capacitors for a minimum reading on the vtvm. Disconnect r-f probe from J105.

Step 7. Set PA PLATE switch ON. Using an insulated tool, adjust L120 for slightly less than maximum r-f output on the undercoupled side of maximum coupling. Retune C134 and C143 for maximum output and tighten the setscrews in the tuning arms.

Step 8. Check power output at 135.00 mc and 135.95 mc. The power output at these two frequencies should be the same within 2 watts. If a difference greater than 2 watts is noted, check tank coils L110, L113, and L115 with tuning wand to determine the adjustment required to increase the lower of two power outputs. Retune C129, C134, and C143 until power output is equalized within 2 watts.

Step 9. Set the channel selector switches on the control unit to 118.50 mc. Tune C118, C129, C134, and C143 by means of their respective tuning arm adjustment screws (see Figure 5–10) for a maximum reading on the r-f wattmeter.

Step 10. Check power output at 118.00 mc and 118.95 mc. The power output at these two frequencies should be the same within 2 watts. If a difference greater than 2 watts is noted, check tank coils L110, L113, and L115 with tuning wand to determine the adjustment required to increase the lower of two power outputs. Retune C129, C134, and C143 until the power output is equalized within 2 watts.

Step 11. Check for power output on all fractional megacycle channels. The power output on all channels should be 12 watts minimum.

Tuner Assembly Adjustments.

Normally, no adjustment of either tuner assembly in the transmitter assembly should be necessary; however, if

s definitely determined that readjustment is required, proceed as follows (see Figure 5–11):

Note

The adjustments must be made with both the transmitter and receiver assemblies installed in the RT-11A and with the gearing assembly in place.

Step 1. To adjust the latching relay position: Rotate he drive cam to maximum throw position. Adjust the elay mounting screws and locking setscrews in the nounting posts, so that with the relay unenergized, the atch overlaps the latching pin by at least .020 inch and lears the pin by at least .015 inch; and with the relay nergized, the latch disengages the latching pin by at east .015 inch clearance on the back stroke.

Step 2. To adjust the driving stroke: Loosen the drive awl pivot screw. With the relay energized, manually djust the pawl position in the slotted end of the driving rm, so that near maximum cam throw, the indexing pin rops into the slot in the index plate in all positions; and n minimum cam throw, the drive pawl retracts suffiiently to engage the following ratchet tooth of the drive atchet plate in all positions.

5–11. MODULATOR ADJUSTMENT.

Note

The preliminary procedure outlined in Table 5–3 must be completed before any of the following alignment and adjustment procedures is begun.

General. Two methods for making modulator adjustments are outlined in the following paragraphs. One method requires the use of an oscilloscope modified for observing the r-f envelope. The other method uses either he a-c meter on the BTK-210 H-22A Transceiver Test anel or an output power meter, similar to General adio Type 583-A, as the audio output meter.

Oscilloscope Method.

Step 1. If a BTK-210 is used, connect the audio scillator to the AUDIO INPUT terminals of the H-22A. f a BTK-210 is not used, connect the audio oscillator nd Ballantine Model 300 Voltmeter to the AUDIO INUT terminals of the alternative test set-up shown in igure 5–9.

Step 2. Set the H-22A a-c meter switch to AUDIO N 0-2V; or if the BTK-210 is not used, set the AUDIO NPUT - MIC switch to AUDIO INPUT.

Step 3. Adjust the audio oscillator to 1000 cps and n output of 1.0 volt, as indicated on the H-22A a-c meter or the Ballantine Model 300. Check that the IDETONE control on the RT-11A is in the extreme lockwise position.

Step 4. Set the channel selector switches to 126.50 mc, the PA PLATE switch ON, and the TRANS KEY switch ON. Couple the oscilloscope to the r-f power amplifier by means of the coupling loop.

Step 5. Set the modulation level control, R418, located on the lower right side of the modulator chassis, to approximately mid position. Increase the setting of the clipping level control, R412, located on the lower left side of the modulator chassis, clockwise until the r-f carrier, as observed on the oscilloscope, becomes modulated. Continue to adjust R412 until limiting occurs, as indicated by no further increase in the modulation level; since the limiting adjustment should be made at a modulation level of about 50%, it may be necessary to adjust R418 at the same time. After the clipping level is set, lock R412.

Step 6. Increase the setting of R418 until the r-f carrier is modulated approximately 90% to 95%. Lock R418.

Alternative Method.

Step 1. If a BTK-210 is used, connect the audio oscillator to the AUDIO INPUT terminals of the H-22A Transceiver Test Panel. If a BTK-210 is not used, connect the audio oscillator and Ballantine Model 300 to the AUDIO INPUT terminals, and the General Radio Type 583-A Output Power Meter, or equivalent, to the AUDIO OUTPUT terminals of the alternative test set-up shown in Figure 5–9.

Step 2. Set the H-22A a-c meter switch to AUDIO IN 0-2V, or if the BTK-210 is not used, set the AUDIO INPUT-MIC switch to AUDIO INPUT.

Step 3. Adjust the audio oscillator to 1000 cps and an output of 1.0 volt, as indicated on the H-22A a-c meter or the Ballantine Model 300. Check that the SIDETONE control on the RT-11A is in the extreme clockwise position.

Step 4. If a BTK-210 is used, set the a-c meter switch to AUDIO OUT 0-10V, the AUDIO switch to SIDETONE, the channel selector switches to 126.50 mc, the PA PLATE switch ON, and the TRANS KEY switch ON. If a BTK-210 is not used, set the General Radio Type 583-A to read 500 milliwatts full scale for 20,000 ohms impedance, AUDIO OUTPUT-PHONE switch to AUDIO OUTPUT, SIDETONE-REC switch to SIDETONE, channel selector switches to 126.50 mc, PA PLATE switch ON, and TRANS KEY switch ON.

Step 5. Set the modulation level control, R418, located on the lower right side of the modulator chassis, to approximately mid position. Increase the setting of the clipping level control, R412, located on the lower left side of the modulator chassis, clockwise until the reading on the audio output meter is maximum. Readjust R418 so that it produces approximately one-third less

than the maximum output previously observed on the audio output meter. Vary the setting of R412 and adjust it to the position where the output just begins to flatten out. After the clipping level is set, lock R412.

Step 6. Increase the setting of modulation level control R418 until a maximum output is indicated on the audio output meter (this reading is equivalent to 100% modulation of the r-f carrier). Rotate R418 slightly counterclockwise until the output reading drops approximately 5% (this setting is equivalent to approximately 90% modulation). Lock R418.

Note

This final meter reading is the sidetone output voltage, measured across a 300-ohm output resistor, and should be at least 3.87 volts (50 milliwatts).

5–12. RECEIVER ALIGNMENT AND ADJUSTMENT.

Tunable I-f Filter.

Note

The preliminary procedure outlined in Table 5–3 must be completed before any of the following alignment and adjustment procedures is begun.

A complete procedure for aligning the tunable i-f filter is given in case replacement of the variable i-f coils, L305 and L306, is necessary; however, these coils are factory-set and the adjusting screws are sealed. The only adjustment normally required is the adjustment of trimmer capacitors C316 and C324 due to replacement of V303 or V304 (refer to Step 5 of this procedure). *No alignment of the i-f filters should be made, even after replacement of V303 or V304, unless the gain measurements, listed in Table 5–10, are unsatisfactory and no other cause can be determined.*

Step 1. For RT-11A units stamped M-1 through M-7, connect the d-c probe of the Hewlett-Packard Model 410B Voltmeter to terminal 3 of i-f transformer T304. Set the vtvm to read −10 volts dc full scale. For units stamped M-8 and higher, connect the d-c probe of the Model 410B to the junction of R329 and R330 on the receiver assembly (see Figure 6–10). Set the vtvm to read −3 volts dc full scale.

Step 2. Connect the output of the Measurements Corporation Model 65-B Signal Generator through a .01-μf capacitor to pin 1 of V304.

Step 3. Set the fractional megacycle channel selector switch to .00 mc. Tune the signal generator for a peak output at 11.7 mc, as indicated on the vtvm. Calibrate and mark the signal generator vernier dial at the meter reading for a 11.7-mc peak.

Note

Since the 1.7-mc i-f transformers are overcoupled, the peak output (for any RT-11A receiver alignment procedure) is defined as the valley between the two output peaks. To avoid agc action when making final alignment adjustments, always adjust the signal generator output to maintain the reading on the vtvm below −6 volts for M-1 through M-7 units, and below −1 volt for M-8 and higher units.

Step 4. Set the fractional megacycle channel selector switch to .95 mc. Tune the signal generator for a peak output at 12.65 mc, as indicated on the vtvm. Calibrate and mark the signal generator vernier dial at the meter reading for a 12.65-mc peak.

Note

In the following steps, when tuning of the signal generator is required at 11.7 mc and 12.65 mc, use the respective calibration marks on the vernier dial to set frequency.

Step 5. Remove the receiver side cover plate. Connect the signal generator output through a .01-μf capacitor to pin 1 of V303. Set the fractional megacycle dial to .00 mc and tune the signal generator to 11.7 mc. Adjust trimmer capacitors C316 and C324, located on the top plate of receiver assembly (see Figure 5–12), for maximum reading on the vtvm.

Step 6. Set the fractional megacycle channel selector switch to .95 mc and tune the signal generator to 12.65 mc. Adjust the slug-tuned inductors, L305 and L306, by rotating each inductor slug inwards or outwards using a small capstan wrench or lever, for a maximum reading on the vtvm.

Step 7. Repeat Steps 5 and 6 until adjustment of L305 and L306 produces a negligible improvement in output as indicated on the vtvm. The inductance adjustment should always be the final adjustment. After the variable i-f alignment is complete, check the input required at each alignment point to get −5 volts on the vtvm for M-1 through M-7 units, or −1 volt for M-8 and higher units. The input at 12.65 mc to get the required vtvm reading will usually be 10 to 20 per cent greater than that required at 11.7 mc. For M-1 through M-7 units, the maximum input to obtain −5 volts output should be no greater than 15 microvolts. For M-8 and higher units, the maximum input to obtain −1 volt output should be no greater than 25 microvolts. After alignment, disconnect the signal generator from the circuit.

Megacycle Oscillator-Doubler.

Step 1. Set the megacycle channel selector switch to 135 mc. Connect the r-f probe of the Model 410B to pin 2 (cathode) of V303 (accessible through a large hol

rovided in the receiver assembly side cover plate). Set he Model 410B to read 3 volts ac full scale.

Step 2. Adjust trimmer capacitor C351, located on he rear bulkhead of the receiver (see Figure 5–12), for maximum reading on the vtvm.

Step 3. Set the megacycle selector switch successively rom 118 mc to 135 mc and note that the doubler out- ut voltage is present on all channels as indicated on the tvm. Presence of this voltage indicates that all mega- ycle crystals are functioning. The doubler output volt- ge should be at least 1.3 volts on all channels.

-f Alignment.

A complete alignment procedure is given; however, lignment should be necessary only if major components uch as tuning capacitors, tuning arms, etc. have been eplaced. Replacement of the first mixer, V303, may equire only adjustment of trimmer capacitor C308B, s outlined in Step 5 of this procedure. *No adjustment f the coils or tuning capacitors should be made unless he gain measurements listed in Table 5–10 are unsatis- actory and no other cause can be determined.*

Step 1. Set the channel selector switches on the con- rol unit to 135.50 mc. Remove the receiver side cover late. Using a No. 4 Bristol wrench, loosen the setscrew n the tuning arm of C305 (see Figure 5–12). Adjust the apacitor rotor by means of the screwdriver slot in the nd of the capacitor shaft so that the rotor is at approxi- nately one-fifth mesh in a clockwise direction. Tighten he setscrew.

Step 2. Loosen the setscrew in the tuning arm of cas- ode grid tuning capacitor C302 (see Figure 5–12) and otate the shaft so that the capacitor rotor is at approxi- nately minimum line-to-line mesh. Tighten the setscrew.

Step 3. For RT-11A units stamped M-1 through M-7, connect the d-c probe of the Model 410B to ter- minal 3 of i-f transformer T304. Set the vtvm to read −10 volts dc full scale. For units stamped M-8 and igher, connect the d-c probe of the Model 410B to the unction of R329 and R330 on the receiver assembly see Figure 6–10). Set the vtvm to read −3 volts dc full cale.

Step 4. If a BTK-210 is used, connect the output of he Boonton Radio Type 211-A VHF Signal Generator o the SIG GEN jack on the front panel of the H-22A.

Note

To prevent damage to the internal impedance resistor in the signal gene ator, the H-22A is equipped with a protective relay which transfers the ANT connector cable connection of the RT-11A from the signal generator to the r-f wattmeter when the transmitter is keyed.

f a BTK-210 is not used, connect the output of the Type 211-A to the ANT jack of the RT-11A.

Caution

When the 211-A is connected to the ANT jack, never key the transmitter with the signal generator connected, as the internal impedance resistor in the signal generator will be damaged.

Step 5. Tune the signal geneartor to 135.50 mc as indicated by a maximum valley reading on the vtvm. A relatively large signal generator output voltage may be required to get a tuning indication. Adjust trimmer capacitors C308A and C308B (see Figure 5–12) with a low-capacity alignment tool for a peak reading on the vtvm.

Note

To avoid agc action when making final alignment adjustments, always adjust the signal generator output to maintain the reading on the vtvm below −6 volts for M-1 through M-7 units, and below −1 volt for M-8 and higher units.

Step 6. Connect a 20-$\mu\mu$f capacitor from the stator of trimmer capacitor C308B to ground and, with the signal generator tuned to 135.50 mc, adjust trimmer capacitor C308A for a peak reading on the vtvm. Check antenna inductor L301 with a tuning wand for optimum peaking. If L301 is not peaked, loosen the setscrew in the tuning arm of C302 and adjust the capacitor rotor as required to obtain optimum peaking.

Step 7. Set the channel selector switches to 118.50 mc and tune the signal generator to 118.50 mc as indicated by a maximum valley reading on the vtvm. Using the tuning wand, check cascode plate tank inductor L303 for optimum tuning. If adjustment is required, adjust the turn spacing of L303 for peak output. Check L301 with the tuning wand for optimum peaking. If adjustment is required, tune C302 by means of its tuning arm adjustment screw (see Figure 5–12).

Step 8. Repeat the procedure of Steps 6 and 7 as required for optimum peaking of C308A and L303.

Step 9. Set the channel selector switches to 135.50 mc. Remove the 20-$\mu\mu$f capacitor from the stator of trimmer capacitor C308B and connect it between the stator of trimmer capacitor C308A and ground. Tune the signal generator to 135.50 mc and adjust trimmer capacitor C308B for a peak reading on the vtvm.

WARNING

THE STATOR OF TRIMMER CAPACITOR C308A IS +220 VOLTS ABOVE GROUND.

Step 10. Set the channel selector switches to 118.50 mc. Tune the signal generator for a maximum valley at 118.50 mc and check first mixer grid inductor L304 with the tuning wand for optimum peaking. If adjustment is required, tune C305 by means of its tuning arm

adjustment screw (see Figure 5–12). Remove the 20-$\mu\mu$f capacitor from the stator of C308A .

Step 11. Install the receiver side cover plate. Set the channel selector switches to 135.50 mc and tune the signal generator to 135.50 mc as indicated by a maximum valley reading on the vtvm. Adjust trimmer capacitor C308B through the access hole in the side cover for peak output.

Step 12. If a BTK-210 is used, set the H-22A a-c meter switch to AUDIO OUT 0-10V and the AUDIO SWITCH to REC. If a BTK-210 is not used, connect a Ballantine Model 300 Voltmeter to the test panel AUDIO OUTPUT terminals. Set the AUDIO OUTPUT-PHONE switch to AUDIO OUTPUT.

Step 13. Set the signal generator attenuator dial to 2.0 microvolts and adjust the internal 1000-cycle modulation to 30% modulation. Tune the signal generator to 135.50 mc and adjust the VOL-OFF control on the control unit for a reading of 5.0 volts, as indicated on the H-22 a-c meter or the Ballantine Model 300. Remove the 1000-cycle modulation from the signal generator and note the drop in output on the a-c meter. For the H-22A a-c meter, the reading should drop to 2.0 volts (8 db) or less. For the Ballantine Model 300, the reading should drop at least 8 db (2.0 volts). This drop in output in db is the S+N/N ratio.

Step 14. Repeat Step 13, without readjusting the VOL control, for each of the following frequencies: 135.00 mc, 135.95 mc, 118.00 mc, 118.50 mc, 118.95 mc, 126.00 mc, 126.50 mc, and 126.95 mc. The S+N/N ratio on all frequencies should be at least 8 db.

Automatic Gain Control.

Step 1. If a BTK-210 is used, set the H-22A a-c meter switch to AUDIO OUT 0-10V. Throw the H-22A AUDIO SWITCH to REC. If a BTK-210 is not used, connect a Ballantine Model 300 to the test panel AUDIO OUTPUT terminals. Set the AUDIO OUTPUT-PHONE switch to AUDIO OUTPUT.

Step 2. Set the signal generator attenuator dial to 2.0 microvolts with 30% modulation, 1000 cps. Tune the signal generator for maximum valley audio output at 135.50 mc. Adjust the VOL-OFF control on the control unit for a convenient peaking level on the H-22A a-c meter or the Ballantine Model 300.

Step 3. Set the signal generator attenuator dial to 10.0 microvolts and adjust the VOL-OFF control for a reading of 2.0 volts on the audio output meter.

Step 4. Set the attenuator dial to 20,000 microvolts and note the rise in audio output on the audio output meter. The audio output should not rise to more than 3.35 volts (4.5 db).

Step 5. Set the attenuator dial to 100,000 microvolts and note the increase in reading on the audio output meter. The audio output should not rise to more than 4.0 volts (6.0 db).

Squelch Maximum Limit Control.

The squelch maximum limit control, R218, located on the RT-11A chassis (See Figure 5–16), is factory-adjusted so that the maximum range of SQUELCH control R211, located on the front panel, is limited to approximately 25 microvolts. To change the maximum range of the SQUELCH control, proceed as follows:

Step 1. Set the SQUELCH control to the extreme clockwise position.

Step 2. Loosen the locknut on the squelch maximum limit control and adjust the control to obtain the maximum squelch level desired by the operator. Tighten the locknut, being careful not to disturb the setting of the control.

Tuner Assembly Adjustments.

Normally, no adjustment of the receiver tuner assembly should be necessary; however, if it is definitely established that readjustment is required, proceed as follows (see Figure 5–11):

Note

The adjustments must be made with both the transmitter and receiver assemblies installed in the RT-11A and with the gearing assembly in place.

Step 1. To adjust the latching relay position: Rotate the drive cam to maximum throw position. Adjust the relay mounting screws and locking setscrews in the mounting posts, so that with the relay unenergized, the latch overlaps the latching pin by at least .020 inch and clears the pin by at least .015 inch; and with the relay energized, the latch disengages the latching pin by at least .015-inch clearance on the back stroke.

Step 2. To adjust the driving stroke: Loosen the drive pawl pivot screw. With the relay energized, manually adjust the pawl position in the slotted end of the driving arm, so that near maximum cam throw, the indexing pin drops into the slot in the index plate in all positions; and in minimum cam throw, the drive pawl retracts sufficiently to engage the following ratchet tooth of the drive ratchet plate in all positions.

5–13. RT-11A MEASUREMENTS.

Tables 5–6, 5–7, 5–8, 5–9, and 5–10 list typical input, voltage, resistance, gain and level, and receiver assembly stage gain measurements, respectively, for the RT-11A Receiver-Transmitter. These measurements were made under the conditions noted in each table.

TABLE 5–6. RT-11A INPUT MEASUREMENTS

Conditions:

1. Equipment connected as shown in Figure 5–8 or Figure 5–9. Test conditions described in paragraph 5–7 and the preliminary procedure outlined in Table 5–3 also apply.
2. Channel selector switches set to 135.00 mc with SCS mode of operation.
3. No r-f signal input under receive condition; no r-f carrier modulation under transmit condition.
4. If a BTK-210 is used, all input measurements are made with the H-22A d-c meter, as noted.
5. If a BTK-210 is not used, all input measurements are made at P-15A Power Unit, using a 20,000 ohms-per-volt voltmeter, such as Simpson Model 260, or a 1000 ohms-per-volt voltmeter, such as Weston Model 564, as noted. All voltages are positive dc and are measured with respect to chassis ground, unless otherwise noted.

MEASUREMENTS WITH BTK-210

H-22A D-C Meter Switch Position	*Receive Condition*[1]	*Transmit Condition*[1]
LV 0-20A	4.5(8.8) amp	6.5(13.2) amp
—120V 0-200 MA	25 ma	50 ma
HV UNFILT 0-400 MA	0 ma	150 ma
HV FILT 0-200 MA	55 ma	60 ma
LV 0-40V	27.5(13.75) volts	27.5(13.75) volts
—120V 0-200V	—130 volts	—110 volts
HV FILT 0-400V	230 volts	320 volts

[1] Currents and voltages shown in parentheses are for 14-volt model.

MEASUREMENTS AT P-15A POWER UNIT

	Test Point		*Receive Condition*[1]				*Transmit Condition*[1]			
			20,000 Ohms/Volt		*1,000 Ohms/Volt*		*20,000 Ohms/Volt*		*1,000 Ohms/Volt*	
Voltage	*Receptacle*	*Pin*	*Scale*	*Voltage*	*Scale*	*Voltage*	*Scale*	*Voltage*	*Scale*	*Voltage*
LV Input	J701	A	50	27.5(13.75)	30	27.5(13.75)	50	27.5(13.75)	30	27.5(13.75)
—120 Volts[2]	J702	E	250	—130	300	—130	250	—110	300	—110
—340V, Filtered	J702	A	250	230	300	230	1000	320	600	320
—340V, Unfiltered	J702	B	250	248	300	248	1000	320	600	335

[1] Voltages shown in parentheses are for 14-volt model.
[2] Reverse polarity of voltmeter leads for this measurement only.

TABLE 5–7. RT-11A VOLTAGE MEASUREMENTS

Conditions:

1. Equipment connected as shown in Figure 5–8 or Figure 5–9. Test conditions described in paragraph 5–7 and the preliminary procedure outlined in Table 5–3 also apply.
2. Channel selector switches set to 135.00 mc with SCS mode of operation.
3. No r-f signal input under receive conditions; no r-f carrier modulation under transmit condition.
4. All measurements are made with a 20,000 ohms-per-volt voltmeter, such as Simpson Model 260, or a 1,000 ohms-per-volt voltmeter, such as Weston Model 564, as noted. All voltages are positive dc and are measured with respect to chassis ground, unless otherwise noted.
5. Heater voltages shown in parentheses are for 14-volt model.

TUBE SOCKET TERMINAL VOLTAGES

Test Point		20,000 Ohms/Volt		1,000 Ohms/Volt	
Tube	Pin No.	Scale	Voltage	Scale	Voltage
V101 (6021)	1	250	90	300	90
	2	2.5	0	3	0
	3	10	6.5(6.3)	30	6.5(6.3)
	4	2.5	0.9	3	0.9
	5	2.5	0.65	3	0.65
	6	50	13.5(13.3)	30	13.5(13.3)
	7	2.5	*	3	*
	8	250	63	300	60
V102 (6021)	1	2.5	0	3	0
	2	250	−110	300	−105
	3	10	6.5(6.3)	30	6.5(6.3)
	4	250	−105	300	−105
	5	250	−105	300	−105
	6	2.5	0(0)	3	0(0)
	7	250	−110	300	−105
	8	2.5	0	3	0
V103 (5718)	1	250	−105	300	−90
	2	—	—	—	—
	3	10	6.5(6.3)	30	6.5(6.3)
	4	—	—	—	—
	5	250	−102	300	−100
	6	2.5	0(0)	3	0(0)
	7	—	—	—	—
	8	10	−4.5	30	−4.5
V104 (5840)	1	2.5	0	3	0
	2	10	7.0	30	7.0
	3	2.5	0(0)	3	0(0)
	4	10	7.0	30	7.0
	5	250	160	300	160
	6	10	6.5(6.3)	30	6.5(6.3)
	7	250	150	300	150
	8	10	7.0	30	7.0

*No significant measurement can be made.

TABLE 5–7. RT-11A VOLTAGE MEASUREMENTS — Continued

TUBE SOCKET TERMINAL VOLTAGES—Continued

Test Point		20,000 Ohms/Volt		1,000 Ohms/Volt	
Tube	Pin No.	Scale	Voltage	Scale	Voltage
V105 (5686)	1	10	9.0	30	9.0
	2	2.5	0	3	0
	3	10	9.0	30	9.0
	4	50	13.5(13.3)	30	13.5(13.3)
	5	10	6.5(6.3)	30	6.5(6.3)
	6	250	210	300	210
	7	1000	265	300	265
	8	10	9.0	30	9.0
	9	250	210	300	210
V106 (6850)	1	250	215	300	215
	2	—	*	—	*
	3	50	13.5(13.3)	30	13.5(13.3)
	4	50	20	30	20
	5	2.5	0(0)	3	0(0)
	6	—	*	—	*
	7	250	215	300	215
	PLT. 1	1000	320	600	320
	PLT. 2	1000	320	600	320
V301 (5718)	1	2.5	0.15	3	0
	2	—	—	—	—
	3	2.5	0(0)	3	0(0)
	4	—	—	—	—
	5	2.5	1.7	3	1.7
	6	10	6.3(6.3)	30	6.3(6.3)
	7	—	—	—	—
	8	250	115	300	115
V302 (5718)	1	250	110	300	67
	2	—	—	—	—
	3	10	6.3(6.3)	30	6.3(6.3)
	4	—	—	—	—
	5	250	115	300	115
	6	50	12.6(12.6)	30	12.6(12.6)
	7	—	—	—	—
	8	250	230	300	230
V303 (5899)	1	2.5	—0.1	3	0
	2	2.5	2.0	3	1.8
	3	50	18.8(6.3)	30	18.8(6.3)
	4	—	—	—	—
	5	250	90	300	85
	6	50	12.6(12.6)	30	12.6(12.6)
	7	250	60	300	50
	8	2.5	2.0	3	1.8
V304 (5899)	1	2.5	0	3	0
	2	2.5	2.0	3	1.8
	3	50	19.2(6.3)	30	19.2(6.3)
	4	—	—	—	—
	5	250	78	300	70
	6	50	25.5(0)	30	25.5(0)
	7	250	75	300	65
	8	—	—	—	—

*No significant measurement can be made.

TABLE 5–7. RT-11A VOLTAGE MEASUREMENTS — Continued

TUBE SOCKET TERMINAL VOLTAGES—Continued

Test Point		20,000 Ohms/Volt		1,000 Ohms/Volt	
Tube	Pin No.	Scale	Voltage	Scale	Voltage
V305 (5899)	1	2.5	0.15	3	0
	2	—	—	—	—
	3	2.5	0(0)	3	0(0)
	4	—	—	—	—
	5	250	105	300	100
	6	10	6.3(6.3)	30	6.3(6.3)
	7	250	63	300	53
	8	2.5	1.6	3	1.5
V306 (5899)	1	2.5	0.15	3	0
	2	—	—	—	—
	3	10	6.3(6.3)	30	6.3(6.3)
	4	—	—	—	—
	5	250	90	300	85
	6	50	12.7(12.6)	30	12.7(12.6)
	7	250	85	300	70
	8	2.5	2.0	3	1.9
V307 (5899)	1	2.5	0	3	0
	2	—	—	—	—
	3	50	12.7(12.6)	30	12.7(12.6)
	4	—	—	—	—
	5	250	110	300	100
	6	50	18.8(6.3)	30	18.8(6.3)
	7	250	85	300	75
	8	2.5	2.1	3	1.85
V308 (5896)	1	2.5	—1.0	3	—0.2
	2	2.5	0.25	3	0.05
	3	50	12.7(12.6)	30	12.7(12.6)
	4	—	—	—	—
	5	2.5	—1.3	3	—0.6
	6	50	18.8(6.3)	30	18.8(6.3)
	7	2.5	0	3	0
	8	—	—	—	—
V309 (6021)	1	250	135	300	135
	2	2.5	0	3	0
	3	10	6.3(6.3)	30	6.3(6.3)
	4	2.5	1.9	3	1.9
	5	2.5	1.7	3	1.7
	6	2.5	0(0)	3	0(0)
	7	2.5	0	3	0
	8	250	125	300	125
V310 (5902)	1	250	—113	300	—90
	2	—	—	—	—
	3	50	25.5(6.3)	30	25.5(6.3)
	4	—	—	—	—
	5	10	—7.5	30	—7.5
	6	50	18.8(0)	30	18.8(0)
	7	2.5	0	3	0
	8	250	—120	300	—120

TABLE 5–7. RT-11A VOLTAGE MEASUREMENTS — Continued

TUBE SOCKET TERMINAL VOLTAGES—Continued

Test Point		20,000 Ohms/Volt		1,000 Ohms/Volt	
Tube	Pin No.	Scale	Voltage	Scale	Voltage
V311 (6112)	1	250	95	300	85
	2	2.5	—0.05	3	0
	3	50	12.7(12.6)	30	12.7(12.6)
	4	2.5	0.6	3	0.5
	5	2.5	0.85	3	0.8
	6	10	6.7(6.3)	30	6.7(6.3)
	7	2.5	—0.05	3	0
	8	250	125	300	70
V401 (6850)	1	250	220	300	220
	2	50	—20.0	—	*
	3	50	13.5(0)	30	13.5(0)
	4	2.5	0	3	0
	5	50	27.0(13.3)	30	27.0(13.3)
	6	50	—20.0	—	*
	7	250	220	300	220
	PLT. 1	1000	330	600	330
	PLT. 2	1000	330	600	330
V402 (0B2)	2	250	220	300	220
	5	1000	330	600	330
V403 (6021)	1	250	105	300	90
	2	2.5	0	3	0
	3	50	20.0(6.7)	30	20.0(6.7)
	4	2.5	2.3	3	1.6
	5	2.5	1.8	3	1.4
	6	50	27.0(13.3)	30	27.0(13.3)
	7	2.5	0	3	0
	8	250	95	300	85
V404 (6021)	1	250	110	300	100
	2	2.5	0	3	0
	3	50	27.0(13.3)	30	27.0(13.3)
	4	2.5	2.15	3	1.85
	5	50	—22.0	3	—2.8
	6	50	20.0(6.7)	30	20.0(6.7)
	7	2.5	—0.15	3	0
	8	250	130	300	120

* No significant measurement can be made.

CHASSIS CONNECTOR TERMINAL VOLTAGES

Test Point		20,000 Ohms/Volt		1,000 Ohms/Volt	
Connector	Pin No.	Scale	Voltage	Scale	Voltage
J201	1	250	160	300	160
	2	50	13.5(13.3)	30	13.5(13.3)
	3	10	6.5(6.3)	30	6.5(6.3)
	4	—	—	—	—
J202	1	250	—120	300	—120
	2	10	6.5(6.3)	30	6.5(6.3)
	3	250	—112	300	—112
	4	2.5	0	3	0

TABLE 5–7. RT-11A VOLTAGE MEASUREMENTS — Continued

CHASSIS CONNECTOR TERMINAL VOLTAGES—Continued

Test Point		20,000 Ohms/Volt		1,000 Ohms/Volt	
Connector	Pin No.	Scale	Voltage	Scale	Voltage
J203	1	250	160	300	160
	2	250	150	300	150
	3	10	6.5(6.3)	30	6.5(6.3)
	4	2.5	0	3	0
J204	1	1000	260	300	260
	2	50	13.5(13.3)	30	13.5(13.3)
	3	50	6.5(6.3)	30	6.5(6.3)
	4	—	—	—	—
J205	1	50	13.5(13.3)	30	13.5(13.3)
	2	1000	330	600	330
J214	1	50	28	30	3.5
	2	2.5	0	3	0
	*3	2.5	0	3	0
	4	250	230	300	230
	5	250	−130	300	−130
	6	10	6.0	30	6.0
	7	50	27.5(13.75)	30	27.5(13.75)
	8	50	25.5(0)	30	25.5(0)
	9	2.5	0	3	0
	10	250	150	300	150
	11	50	12.7(12.6)	30	12.7(12.6)
	12	250	−120	300	−120
J215	1	—	—	—	—
	2	50	25.5(12.6)	30	25.5(12.6)
	3	—	—	—	—
	4	50	20(6.7)	30	20(6.7)
	5	250	−110	300	−110
	6	250	210	300	210
	7	50	27.0(13.3)	30	27.0(13.3)
	8	1000	330	600	330
	9	50	27.0(13.3)	30	27.0(13.3)
	10	50	27.0(13.5)	30	27.0(13.5)
	11	50	13.2(0)	30	13.2(0)
	12	50	27.0(13.3)	30	27.0(13.3)
P202	—	1000	330	600	330
P204	†1	50	27.5(13.75)	30	27.5(13.75)
	2	50	27.5(13.75)	30	27.5(13.75)
	3	2.5	0		0

* During tuning cycle, LV+ will be on this terminal.
† During tuning cycle, zero volts will be on this terminal.

TABLE 5–8. RT-11A RESISTANCE MEASUREMENTS

Conditions:

1. All cables disconnected from RT-11A Receiver-Transmitter.
2. Controls on RT-11A front panel set as follows: SQUELCH full counterclockwise; SIDETONE full counterclockwise.
3. All measurements made from pin indicated to chassis ground, unless otherwise noted. Negative ohmmeter probe grounded.
4. All resistance values are in ohms. Multiplier: K = 1,000; MEG = 1,000,000.
5. Terminals designated NC = no connection.
6. Heater resistances shown in parentheses are for 14-volt model.

	Pin Number							
Tube	1	2	3	4	5	6	7	8
V101	∞	10	1.4 (1.4)	220	220	2.5 (2.0)	33K	∞
V102	0	130K	1.4 (1.4)	120K	120K	0 (0)	130K	0
V103	150K	NC	1.4 (1.4)	NC	120K	0 (0)	NC	560
V104	33K	§150	0 (0)	§150	∞	1.4 (1.4)	∞	§150
V105	220	11K	220	2.5 (2.0)	1.4 (1.4)	∞	∞	NC
V106	∞	23K	2.0 (2.0)	150	0 (0)	23K	∞	*∞
V301	0.5M	NC	0 (0)	NC	100	4.0 (1.6)	NC	∞
V302	250K	NC	4.0 (1.6)	NC	∞	2.8 (2.5)	NC	90K
V303	500K	680	5.5 (1.6)	NC	110K	2.2 (2.5)	240K	680
V304	0	680	5.5 (1.6)	NC	120K	4.0 (0)	190K	NC
V305	500K	NC	0 (0)	NC	105K	1.6 (1.6)	190K	470
V306	500K	NC	1.6 (1.6)	NC	105K	2.5 (2.5)	190K	470
V307	0	NC	2.5 (2.5)	NC	105K	3.5 (1.6)	190K	680
V308	‖170K	22K	2.5 (2.5)	NC	300K	3.5 (1.6)	0	NC
V309	92K	33K	1.6 (1.6)	220	220	0 (0)	10	93K
V310	550K	NC	3.5 (0)	NC	180	3.5 (1.6)	0	120K
V311	190K	1.5M	2.5 (2.5)	470	10K	1.6 (1.6)	350K	560K
V401	∞	130K	2.0 (0)	0	2.8 (2.0)	130K	∞	*∞
V402	NC	∞	NC	NC	∞	NC	NC	NC
V403	∞	220K	3.5 (2.8)	2.2K	1.6K	2.8 (2.0)	†50K	∞
V404	∞	‡220K	2.8 (2.0)	1.0K	170K	3.5 (2.8)	1.1M	∞

* Top plate connections.
† Varies with setting of R412 (Clipping Level).
‡ Varies with setting of R418 (Modulation Level).
§ 1K for M-1 through M-4 units.
‖ 400K for M-1 through M-7 units.

TABLE 5–9. RT-11A LEVEL MEASUREMENTS

Conditions:

1. Equipment connected as shown in Figure 5–8 or Figure 5–9. Test conditions described in paragraph 5–7 and preliminary procedure outlined in Table 5–3 apply.
2. Channel selector switches set to 135.00 mc with SCS mode of operation, unless noted otherwise.
3. All voltage measurements made with vacuum tube voltmeter such as Hewlett-Packard Model 410B, or equivalent.
4. Transmitter voltage measurements made with no r-f carrier modulation.
5. Modulator voltages measured with Hewlett-Packard Model 200AB Audio Oscillator connected to AUDIO INPUT terminals of test set-up; also, if BTK-210 is not used, set AUDIO INPUT-MIC switch to AUDIO INPUT. Adjust audio oscillator to 1000 cps with output of 1.0 volt. Set PA PLATE switch OFF and TRANS KEY switch ON. Set clipping level and modulation level controls, R412 and R418, to approximate mid-point position.
6. Receiver audio amplifier voltages measured with Boonton Radio Corp. Type 211-A Signal Generator connected to SIG GEN jack if BTK-210 is used, RT-11A ANT jack if BTK-210 is not used. Adjust signal generator for 20-μv output at 135.50 mc, modulated 30% at 1000 cps. Set channel selector switches to 135.50 mc and VOL-OFF control to extreme clockwise position.

OSCILLATOR R-F VOLTAGES

Oscillator	Frequency (mc)	Test Point	Voltage (RF)
Receiver Megacycle	118-135[1]	Pins 2 and 8, V303	1.25 to 2.5
Transmitter Megacycle	118-135[1]	Junction C103 and L102	1.5 to 3.0
Fractional Megacycle	.00-.95	Pin 2, V304	0.9 to 1.5

TRANSMITTER TEST POINT VOLTAGES
(Refer to Condition No. 4)

Test Point	Frequency[2] (mc)	Voltage (DC)
TP1 (driver amplifier grid)	118.00-135.95	—0.4 to —0.8
TP2 (driver amplifier cathode)	118.00-135.95	7.5 to 8.8
TP3 (power amplifier grid)	118.00-135.95	—4.0 to —6.0
TP4 (power amplifier cathode)	118.00-135.95	18.0 to 22.0

MODULATOR AUDIO LEVEL MEASUREMENTS
(Refer to Condition No. 5)

Test Point	Voltage (AC)
Pin 2, V403 (microphone amplifier grid)[3]	0.65
Pin 7, V403 (a-f amplifier grid)	3.0
Pin 2, V404 (a-f amplifier grid)	1.6
Pin 7, V404 (a-f driver amplifier grid)	22.0
Pin 2, V401 (push-pull modulator grid)	17.5
Pin 6, V401 (push-pull modulator grid)	17.5

See footnotes at end of table.

TABLE 5–9. RT-11A LEVEL MEASUREMENTS — Continued

RECEIVER AUDIO AMPLIFIER LEVEL MEASUREMENTS

(Refer to Condition No. 6)

Test Point	Voltage (AC)	
	M-1 — M-7	M-8 & up
Junction R329 and R330 (diode detector load resistor)	0.32	0.20
Pin 2, V311 (first a-f amplifier grid)	0.30	0.18
Pin 1, V311 (first a-f amplifier plate)	11.0	8.5
Pin 1, V310 (a-f power amplifier grid)	7.5	5.5
AUDIO OUTPUT terminals of test set-up (receiver a-f output)[4]	16.0	16.0

elect megacycle channels only.
elect all megacycle channels, and then all fractional megacycle channels.
et TRANS KEY to OFF for this measurement only, to prevent reading error due to regeneration caused by a-c probe connection.
f a BTK-210 is used, set AUDIO switch to REC, and check that no external audio load is connected to H-22A PHONE jack. If a BTK-210 is not used, set DETONE-REC switch to REC and AUDIO OUTPUT-PHONE switch to AUDIO OUTPUT.

TABLE 5–10. RECEIVER ASSEMBLY STAGE GAIN MEASUREMENTS

Conditions:

1. Equipment connected as shown in Figure 5–8 or Figure 5–9. Test conditions described in paragraph 5–7 and preliminary procedure outlined in Table 5–3 apply.
2. Channel selector switches set to 135.00 mc with SCS mode of operation.
3. The 1.7-mc and 11.7-mc signals are supplied by Measurements Corp. Model 65-B Signal Generator, or equivalent. Signal coupled to all measurement points through .01-μf capacitor and with signal generator ground lead connected to RT-11A chassis.
4. For RT-11A units stamped M-1 through M-7, the input shown for 1.7-mc and 11.7-mc signals and 135.00-mc signal at V303 is signal level required to obtain −5.0 volts dc between the top of the detector load (junction of resistors R329 and R331) and chassis ground. For RT-11A units stamped M-8 and higher, the input shown for 1.7-mc and 11.7-mc signals and 135.00-mc signal at V303 is signal level required to obtain −1.0 volt dc between the tap (junction of resistors R329 and R330) on the detector load and chassis ground. This voltage must be read by d-c vacuum tube voltmeter, such as Hewlett-Packard Model 410B, or equivalent.
5. The 135.00-mc r-f signal is supplied by Boonton Radio Corp. Type 211-A Signal Generator, or equivalent. For r-f measurement at V303, use .01-μf capacitor in series with the output cable but without the Boonton Radio Type 505-B 6-db pad.
6. For RT-11A units stamped M-1 through M-7, the input shown for 135.00-mc signal measured at RT-11A ANT connector is signal level required to obtain −7.0 volts dc between the top of the detector load (junction of resistors R329 and R331) and chassis ground. For RT-11A units stamped M-8 and higher, the input shown for 135.00-mc signal measured at RT-11A ANT connector is signal level required to obtain −1.0 volt dc between the tap (junction of resistors R329 and R330) on the detector load and chassis ground.

TABLE 5–10. RECEIVER ASSEMBLY STAGE GAIN MEASUREMENTS — Continued

1.7-MC I-F MEASUREMENTS

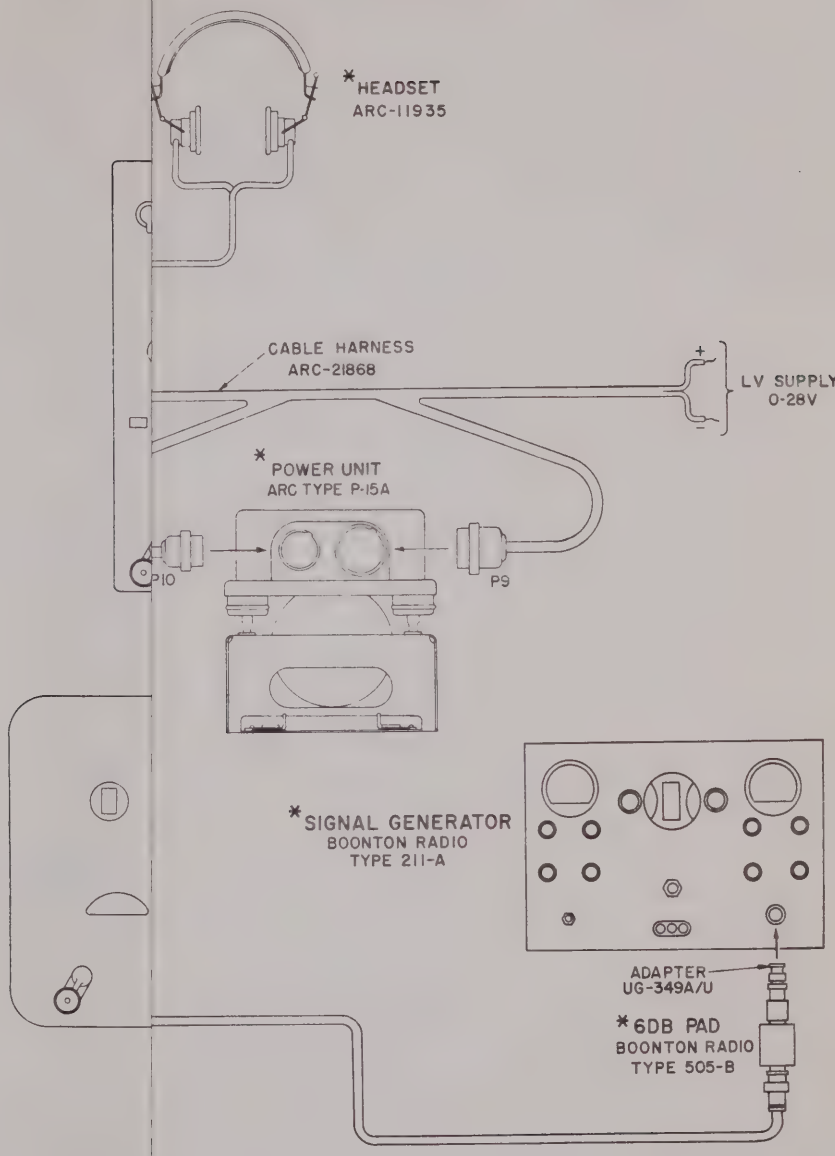
Tube	Signal Input			Conditions
	Pin No.	μV		
		M-1 — M-7	M-8 & up	
V307 (3rd 1.7-mc i-f amplifier)	1	370K	700K	3 and 4
V306 (2nd 1.7-mc i-f amplifier)	1	15K	30K	3 and 4
V305 (1st 1.7-mc i-f amplifier)	1	600	1.4K	3 and 4
V304 (second mixer)	1	60	145	3 and 4

11.7-MC I-F MEASUREMENTS

Tube	Signal Input			Conditions
	Pin No.	μV		
		M-1 — M-7	M-8 & up	
V304 (second mixer)	1	90	190	3 and 4
V303 (first mixer)	1	6	19	3 and 4

135.00-MC R-F MEASUREMENTS

Tube	Signal Input			Conditions
	Pin No.	μV		
		M-1 — M-7	M-8 & up	
V303 (first mixer)	1	10	16	4 and 5
V301 (r-f cascode amplifier)	ANT Jack	2	3	5 and 6



NOTES:

1. PARTS MARKED WITH AN ASTER
   NOT SUPPLIED AS PART OF THE
   KIT.
2. CONTROL UNIT RECEPTACLES A
   OF ALL UNITS.
3. WHEN NO EXTERNAL CONTROL
   CONNECTED IN BENCH TEST, RE
   FROM "R/T CONTROL" POSITIO
   INSTALL AT "INTERNAL CONTR
   POSITION.

TP1511

Figure 5–8. Bench Test Interconnection Diagram with ARC Type BTK-210

TABLE 5–10. RECEIVER ASSEMBLY STAGE GAIN MEASUREMENTS — Continued

1.7-MC I-F MEASUREMENTS

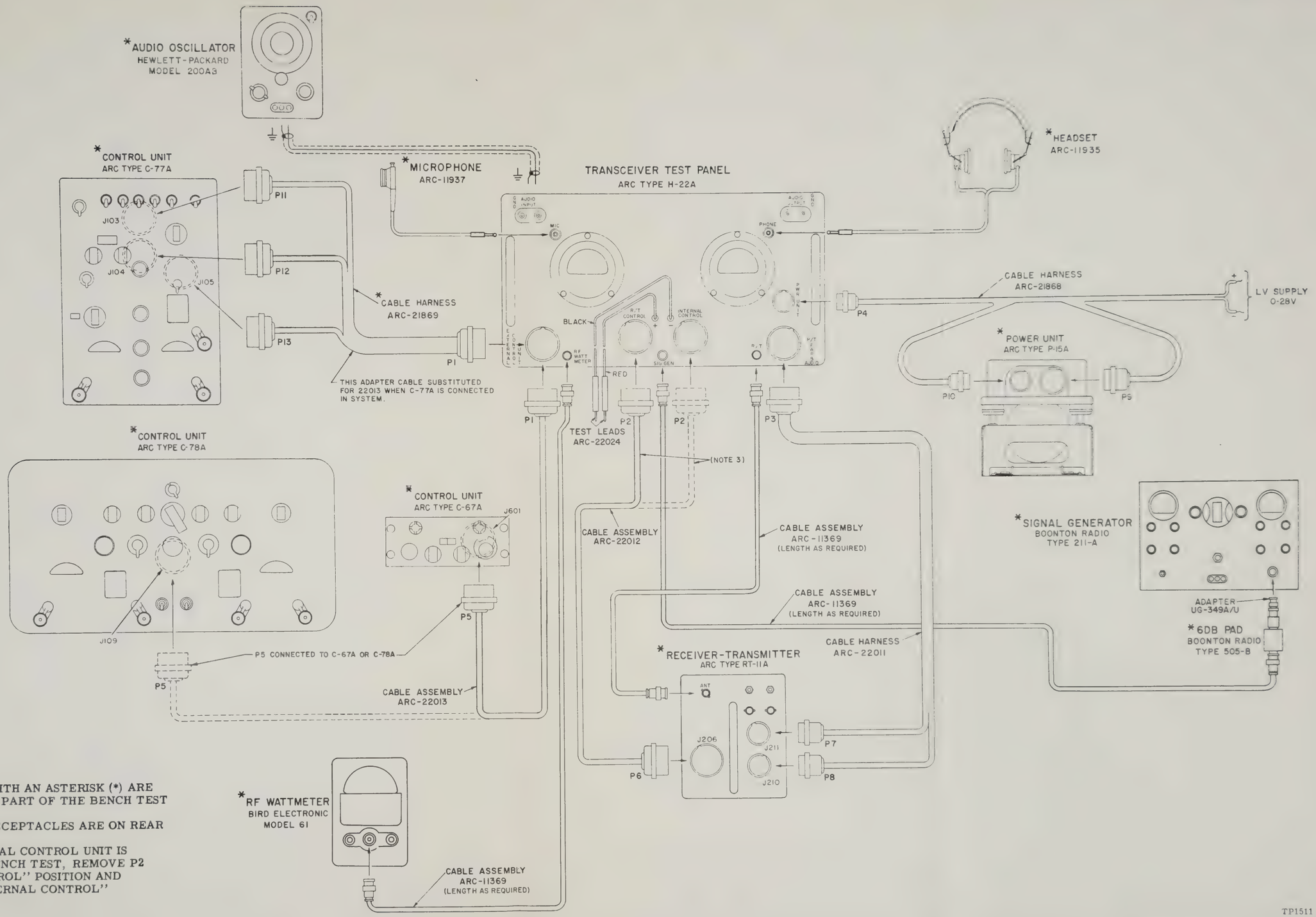
Tube	Signal Input			Conditions
	Pin No.	μV		
		M-1 — M-7	M-8 & up	
V307 (3rd 1.7-mc i-f amplifier)	1	370K	700K	3 and 4
V306 (2nd 1.7-mc i-f amplifier)	1	15K	30K	3 and 4
V305 (1st 1.7-mc i-f amplifier)	1	600	1.4K	3 and 4
V304 (second mixer)	1	60	145	3 and 4

11.7-MC I-F MEASUREMENTS

Tube	Signal Input			Conditions
	Pin No.	μV		
		M-1 — M-7	M-8 & up	
V304 (second mixer)	1	90	190	3 and 4
V303 (first mixer)	1	6	19	3 and 4

135.00-MC R-F MEASUREMENTS

Tube	Signal Input			Conditions
	Pin No.	μV		
		M-1 — M-7	M-8 & up	
V303 (first mixer)	1	10	16	4 and 5
V301 (r-f cascode amplifier)	ANT Jack	2	3	5 and 6

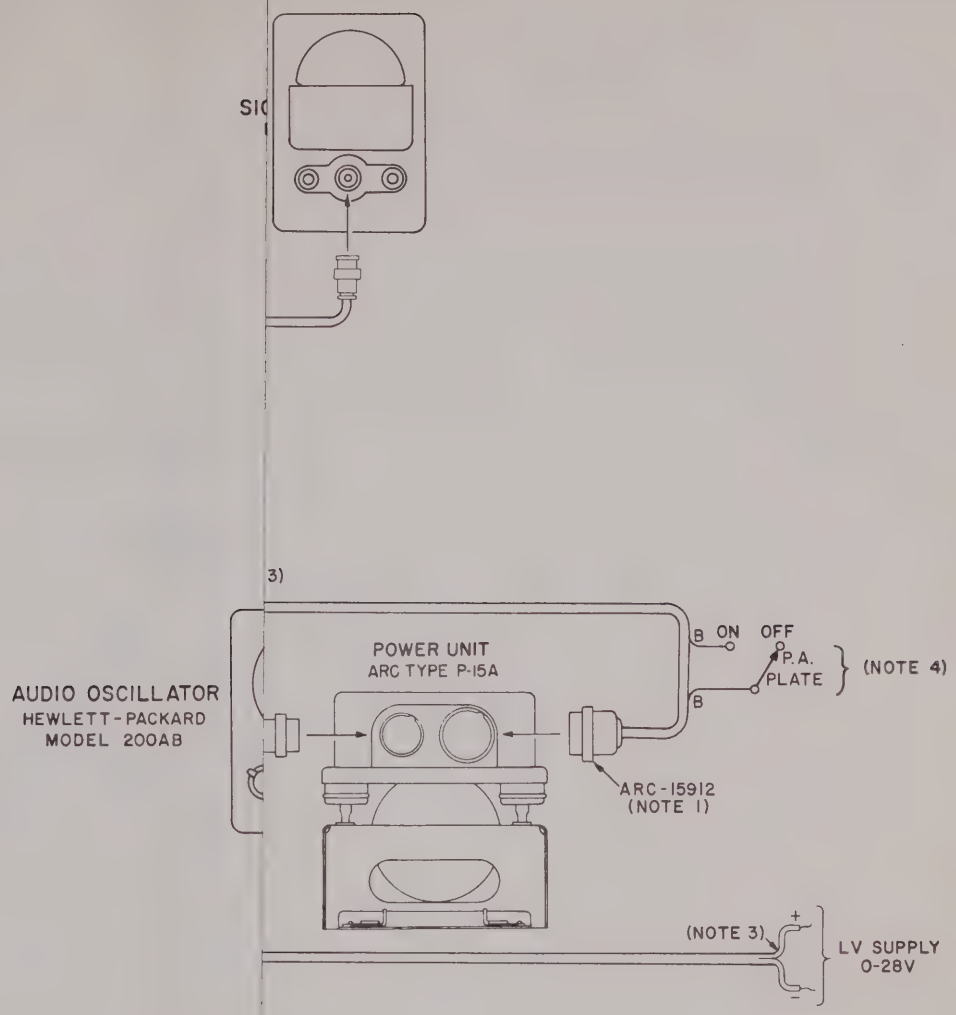


NOTES:

1. PARTS MARKED WITH AN ASTERISK (*) ARE NOT SUPPLIED AS PART OF THE BENCH TEST KIT.
2. CONTROL UNIT RECEPTACLES ARE ON REAR OF ALL UNITS.
3. WHEN NO EXTERNAL CONTROL UNIT IS CONNECTED IN BENCH TEST, REMOVE P2 FROM "R/T CONTROL" POSITION AND INSTALL AT "INTERNAL CONTROL" POSITION.

TP1511

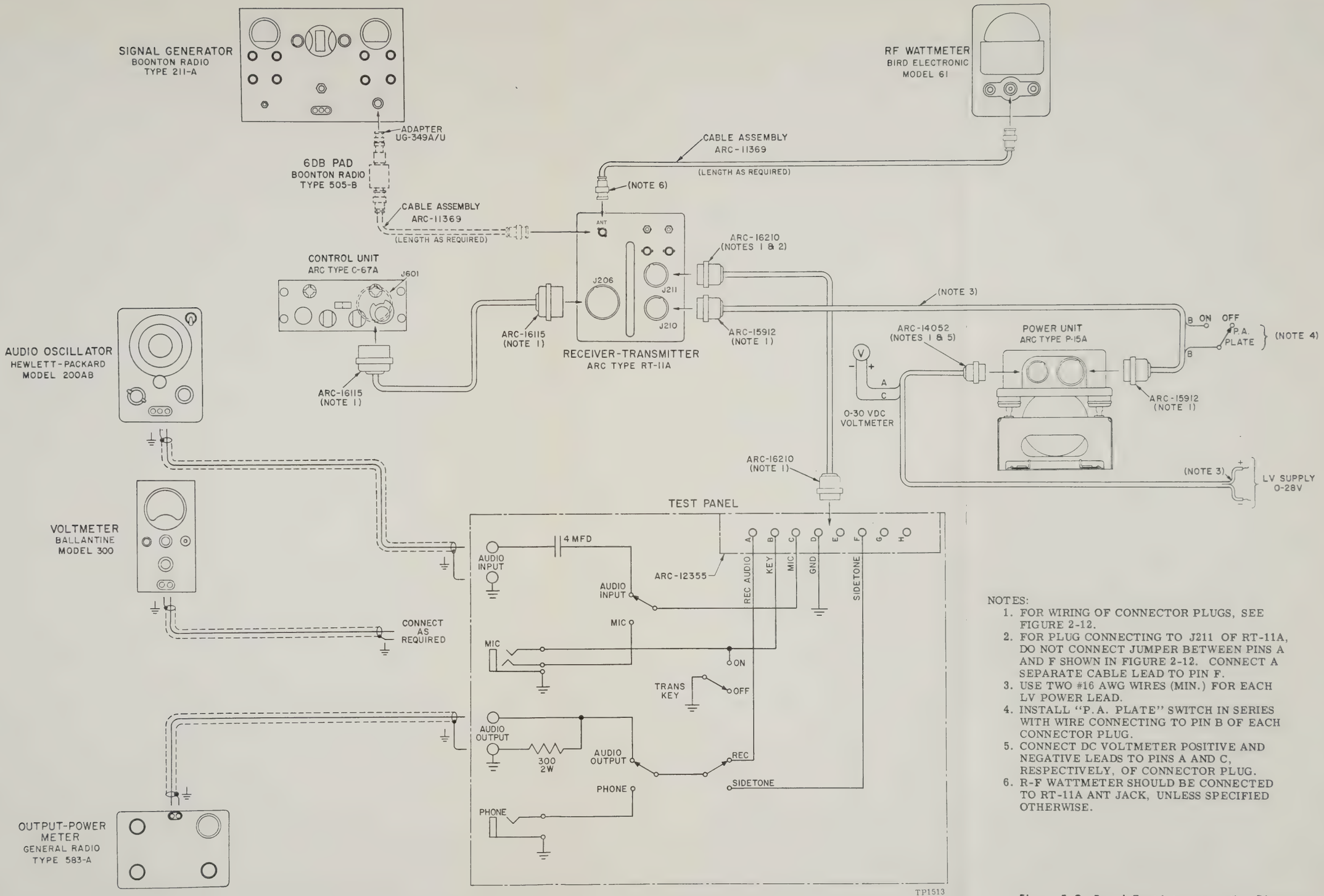
Figure 5–8. Bench Test Interconnection Diagram with ARC Type BTK-210



NOTES:

1. FOR WIRING OF CONNECTOR PLUGS, SEE FIGURE 2-12.
2. FOR PLUG CONNECTING TO J211 OF RT-11A, DO NOT CONNECT JUMPER BETWEEN PINS A AND F SHOWN IN FIGURE 2-12. CONNECT A SEPARATE CABLE LEAD TO PIN F.
3. USE TWO #16 AWG WIRES (MIN.) FOR EACH LV POWER LEAD.
4. INSTALL "P.A. PLATE" SWITCH IN SERIES WITH WIRE CONNECTING TO PIN B OF EACH CONNECTOR PLUG.
5. CONNECT DC VOLTMETER POSITIVE AND NEGATIVE LEADS TO PINS A AND C, RESPECTIVELY, OF CONNECTOR PLUG.
6. R-F WATTMETER SHOULD BE CONNECTED TO RT-11A ANT JACK, UNLESS SPECIFIED OTHERWISE.

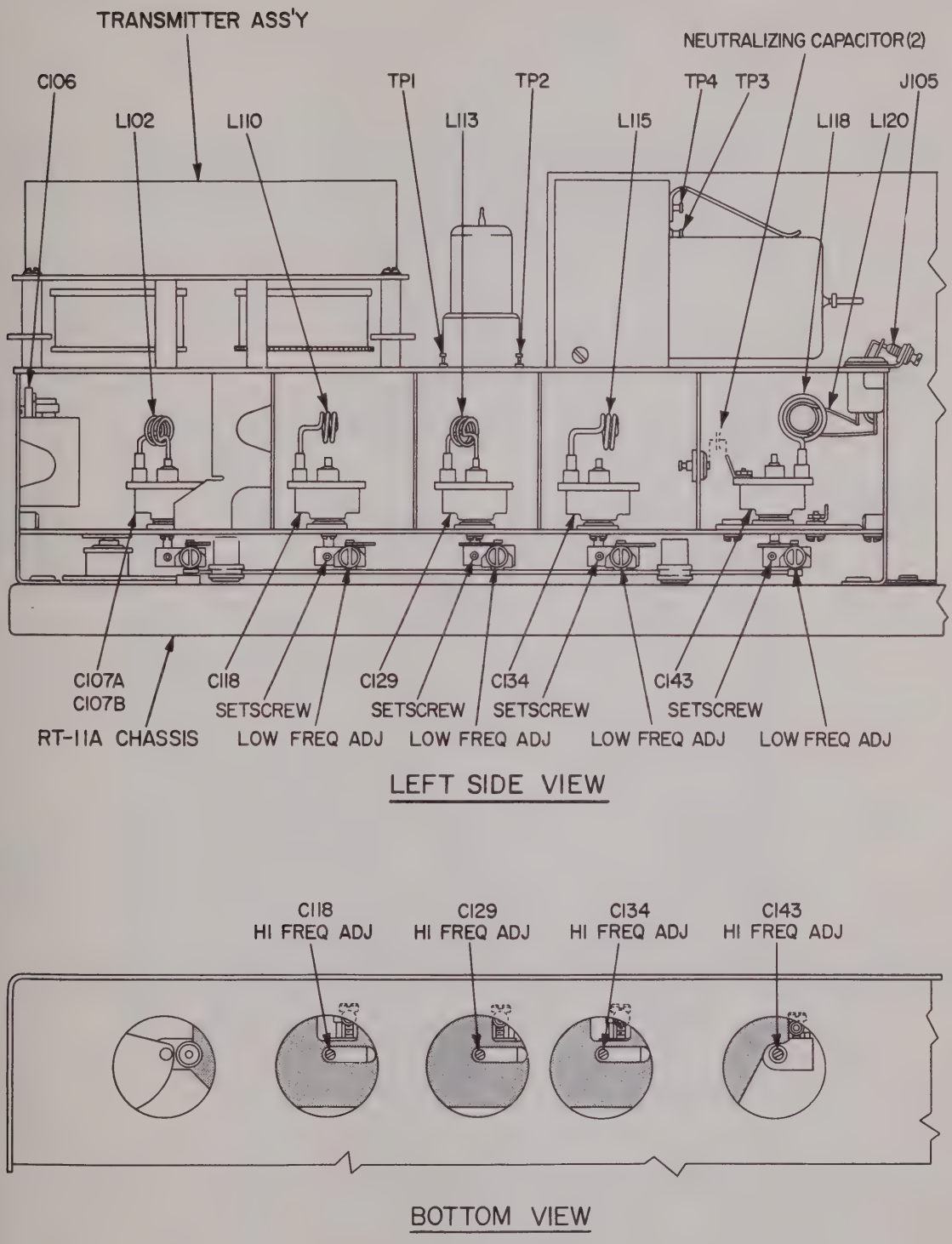
Figure 5–9. Bench Test Interconnection Diagram without ARC Type BTK-210



NOTES:

1. FOR WIRING OF CONNECTOR PLUGS, SEE FIGURE 2-12.
2. FOR PLUG CONNECTING TO J211 OF RT-11A, DO NOT CONNECT JUMPER BETWEEN PINS A AND F SHOWN IN FIGURE 2-12. CONNECT A SEPARATE CABLE LEAD TO PIN F.
3. USE TWO #16 AWG WIRES (MIN.) FOR EACH LV POWER LEAD.
4. INSTALL "P.A. PLATE" SWITCH IN SERIES WITH WIRE CONNECTING TO PIN B OF EACH CONNECTOR PLUG.
5. CONNECT DC VOLTMETER POSITIVE AND NEGATIVE LEADS TO PINS A AND C, RESPECTIVELY, OF CONNECTOR PLUG.
6. R-F WATTMETER SHOULD BE CONNECTED TO RT-11A ANT JACK, UNLESS SPECIFIED OTHERWISE.

Figure 5–9. Bench Test Interconnection Diagram without ARC Type BTK-210



TP1265

Figure 5–10. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly Adjustment Points

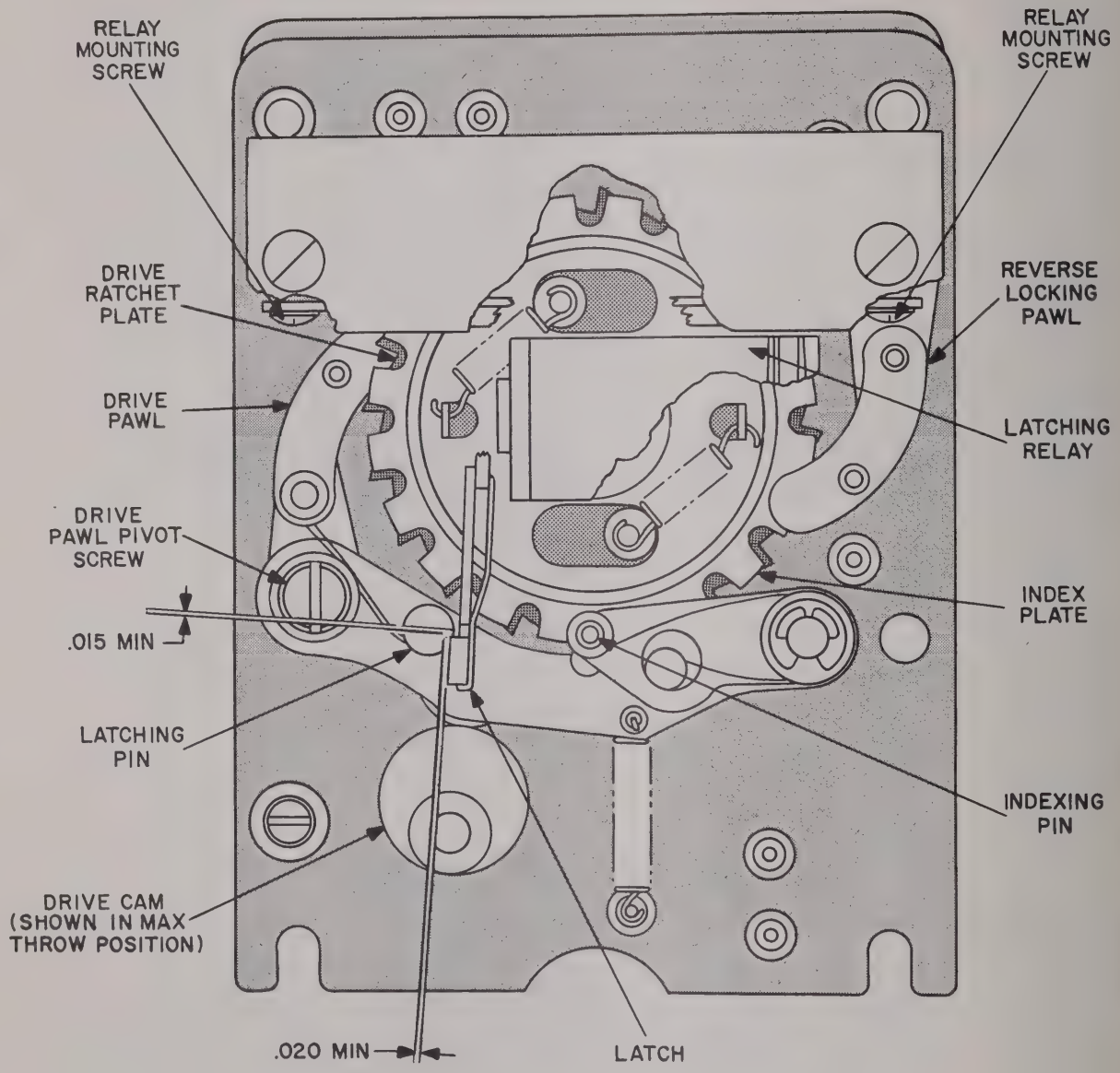
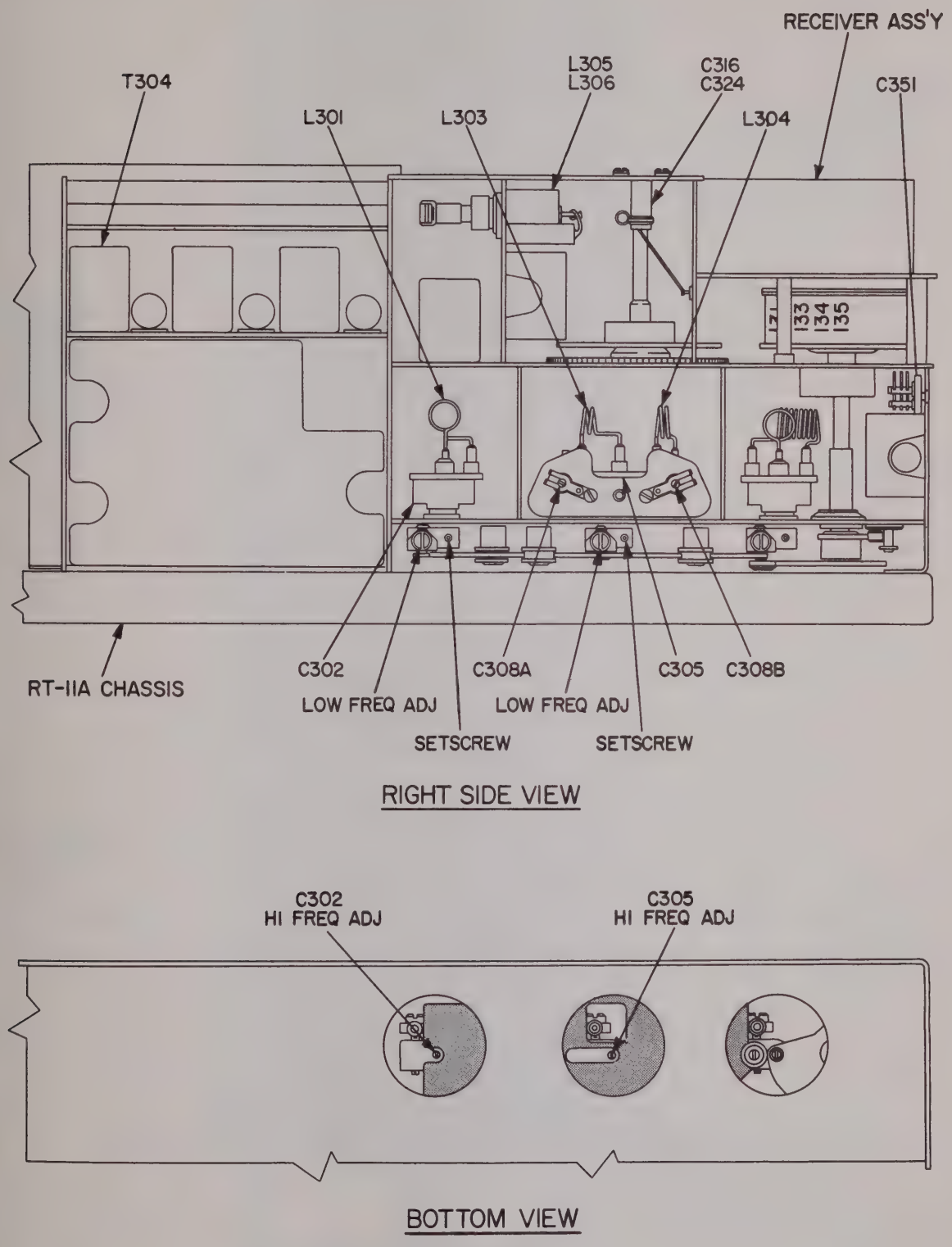


Figure 5–11. ARC Type RT-11A Receiver-Transmitter, Transmitter and Receiver Tuner Assembly Adjustment Points

TP12(



TP1267

Figure 5–12. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly Adjustment Points

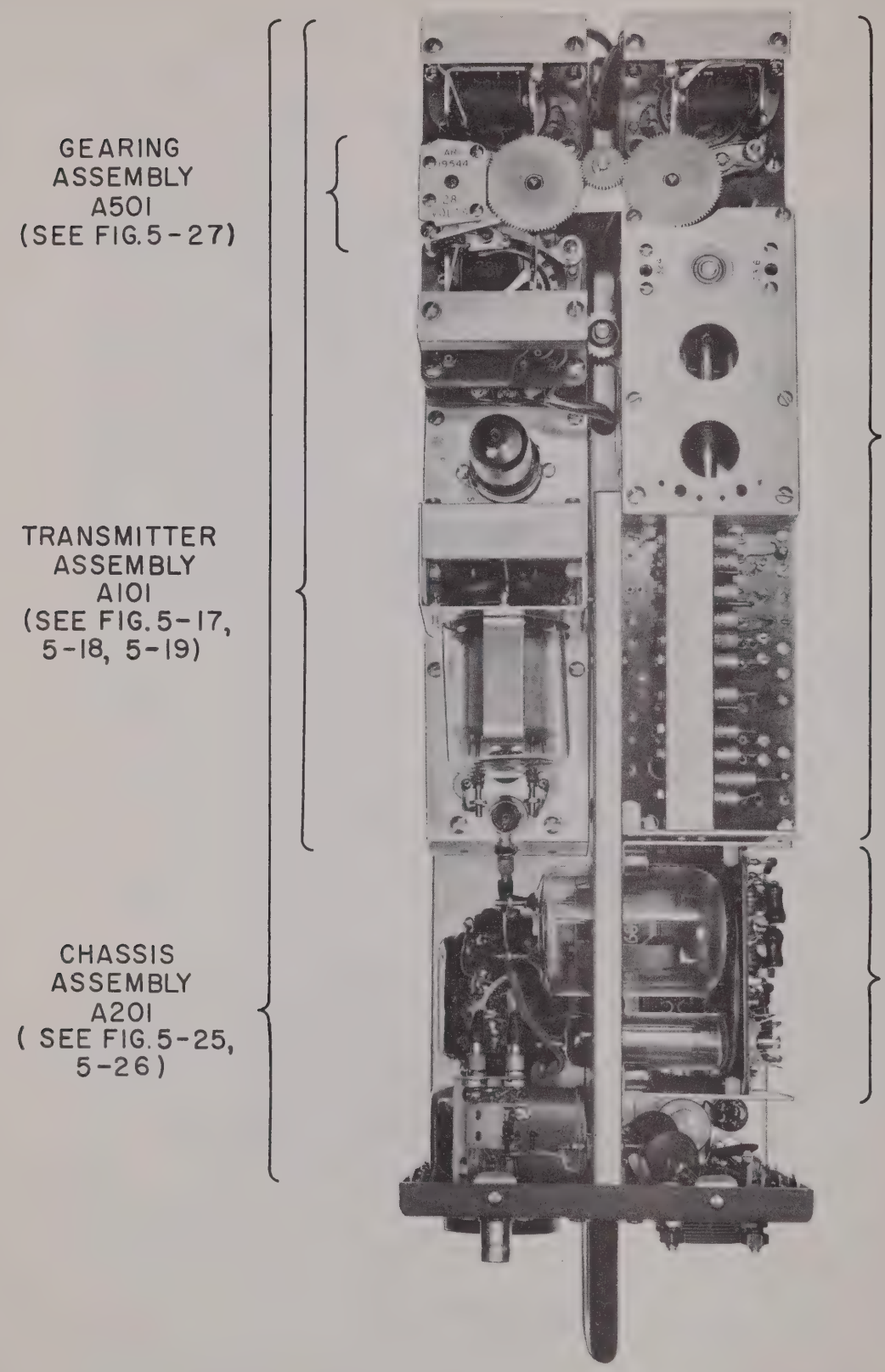


Figure 5–13. ARC Type RT-11A Receiver-Transmitter, Top Interior View

TP119C

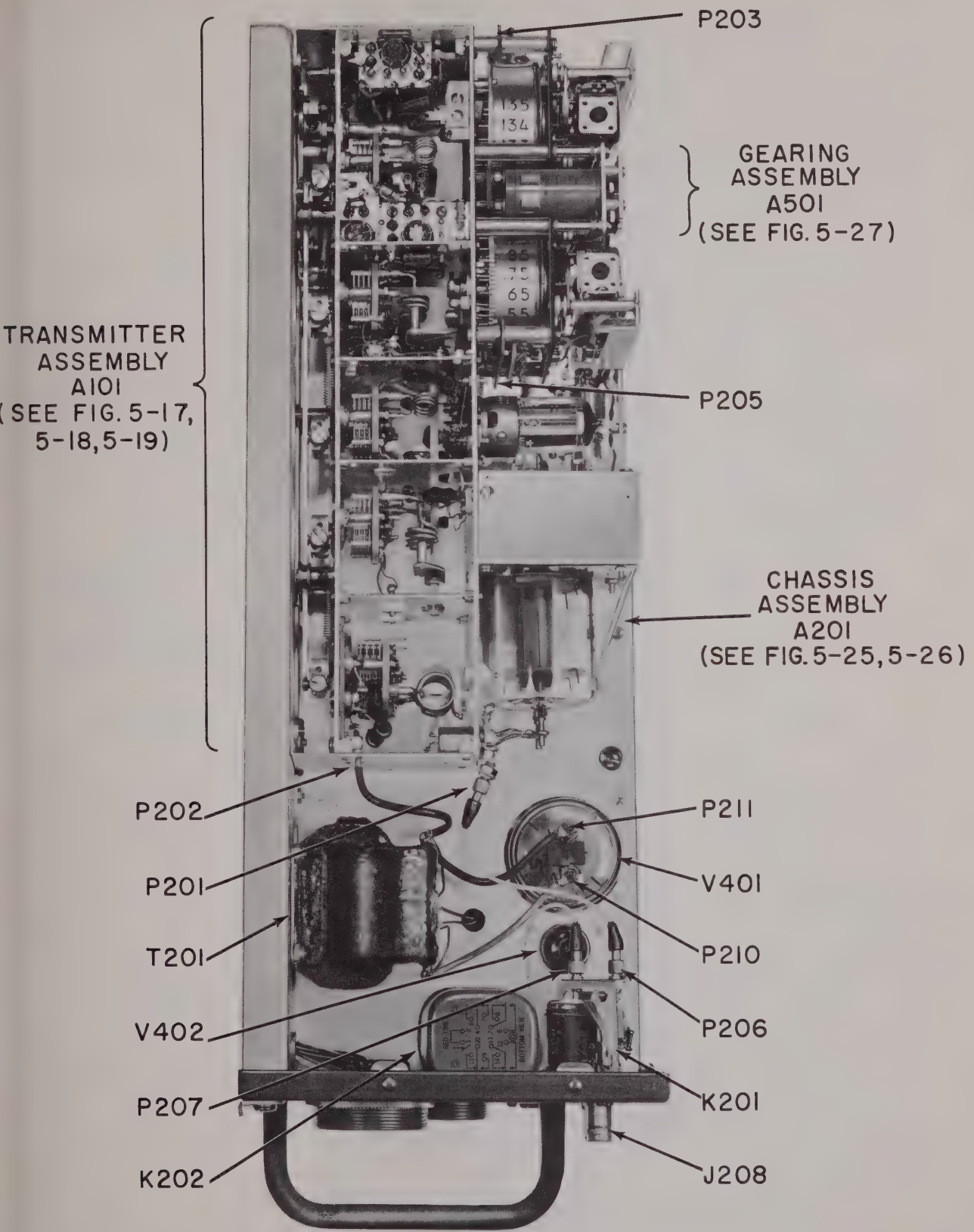


Figure 5–14. ARC Type RT-11A Receiver-Transmitter, Left Interior View

TP1192

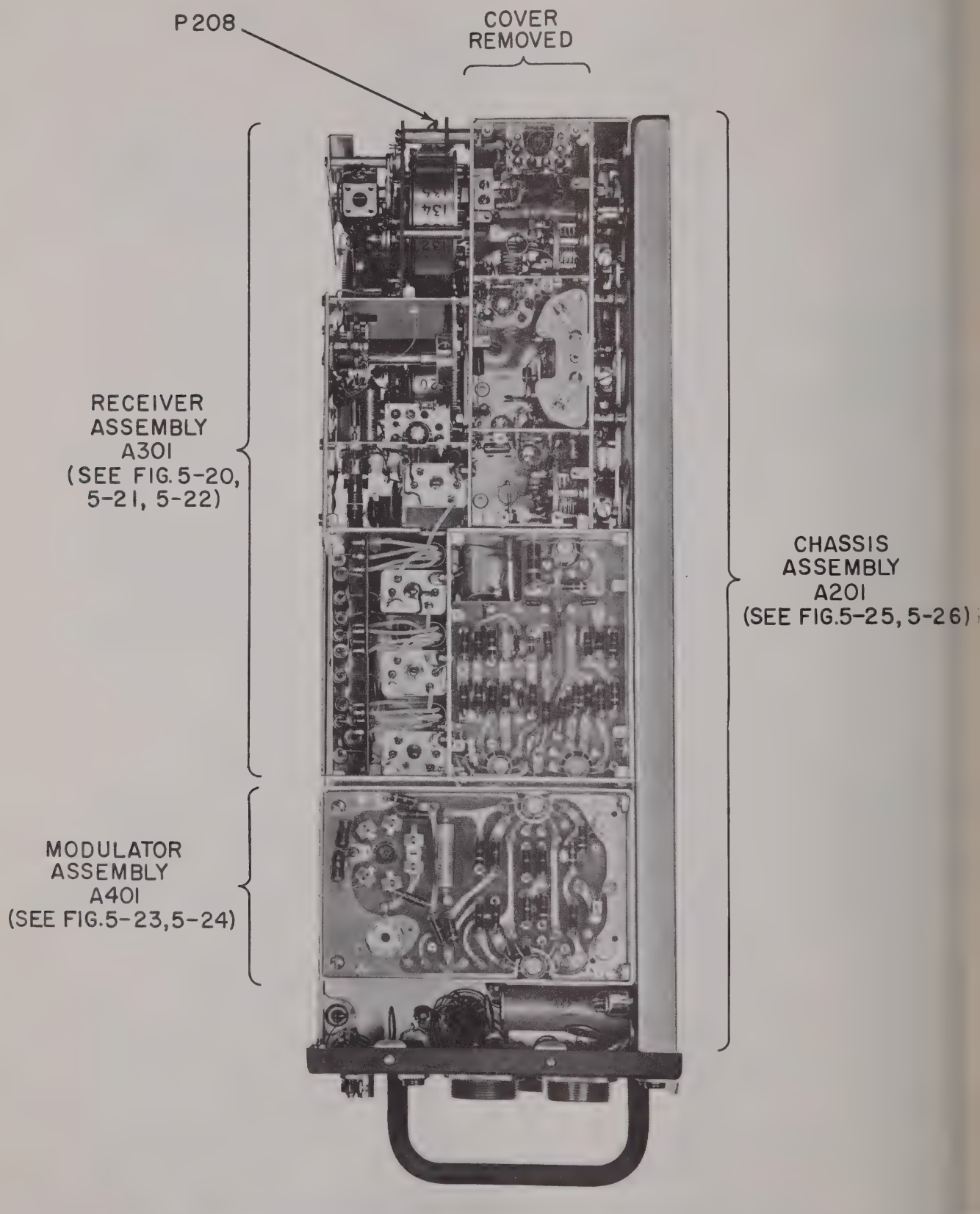
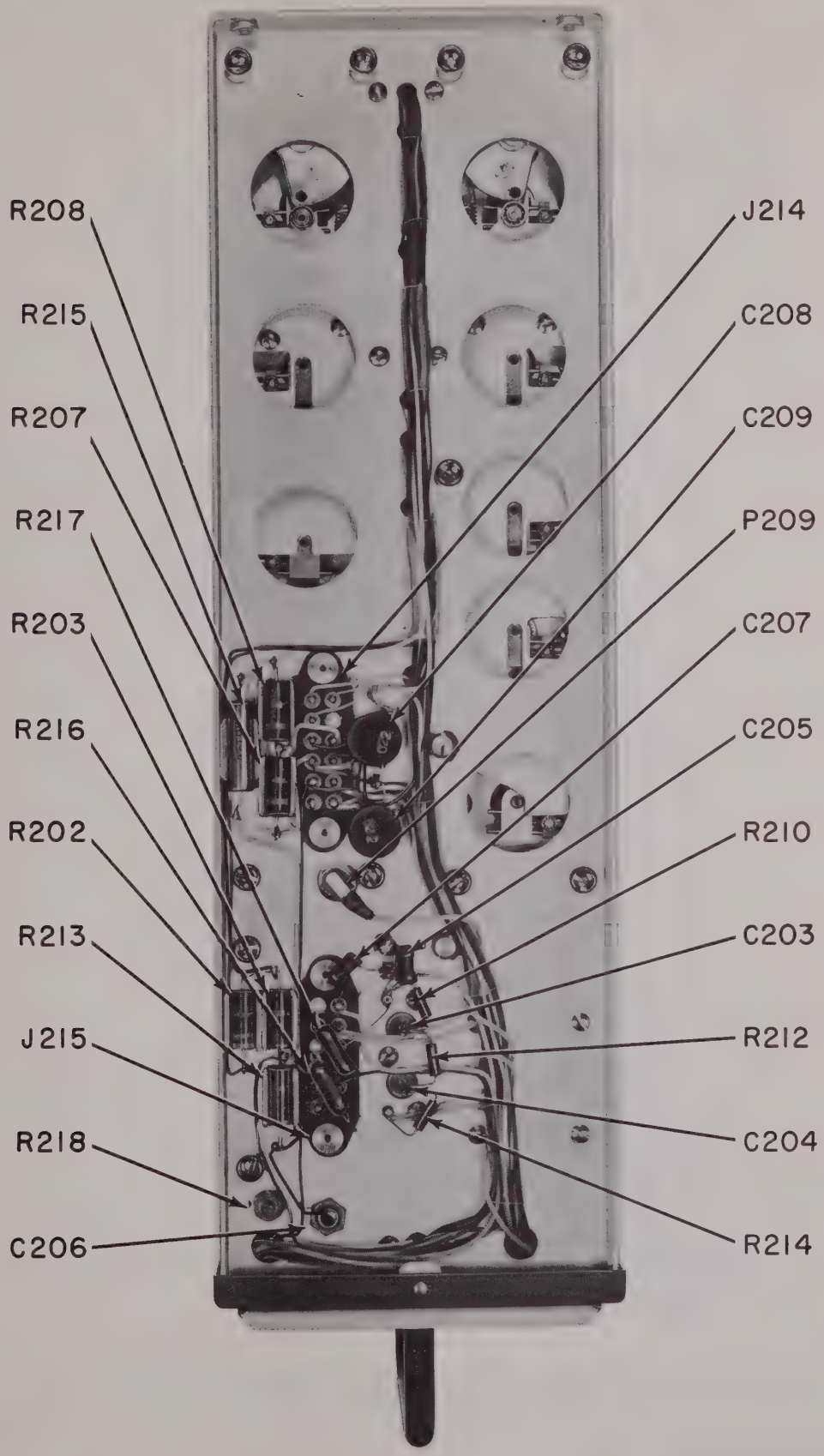
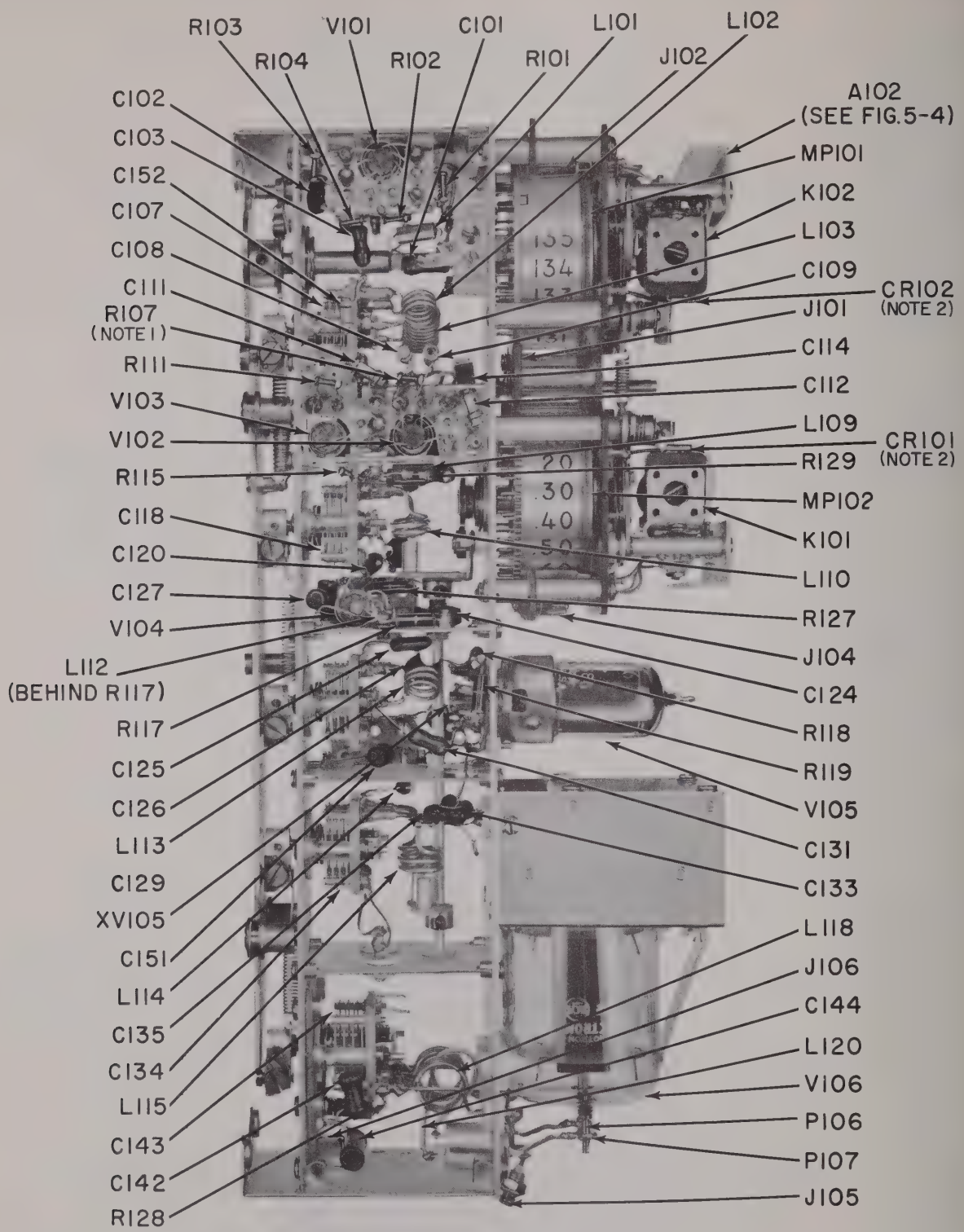


Figure 5–15. ARC Type RT-11A Receiver-Transmitter, Right Interior View, Receiver R-f Cover Removed



TP1196

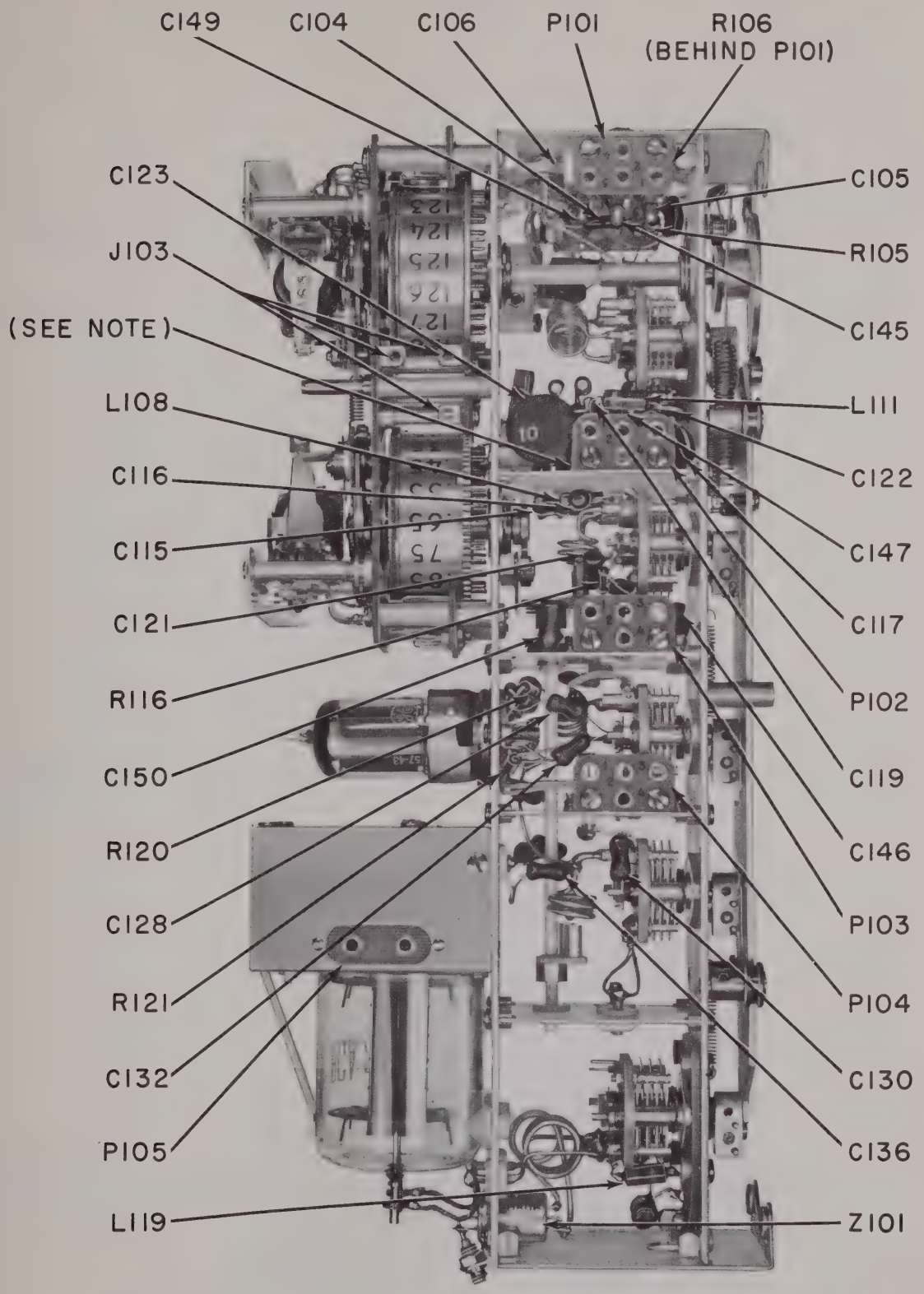
Figure 5–16. ARC Type RT-11A Receiver-Transmitter, Bottom Interior View



NOTES:
1. R107 REMOVED IN M-5 AND HIGHER UNITS.
2. CR101 AND CR102 ADDED IN M-6 THROUGH M-9 UNITS, DELETED IN M-10 UNITS.

Figure 5–17. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Left Side View

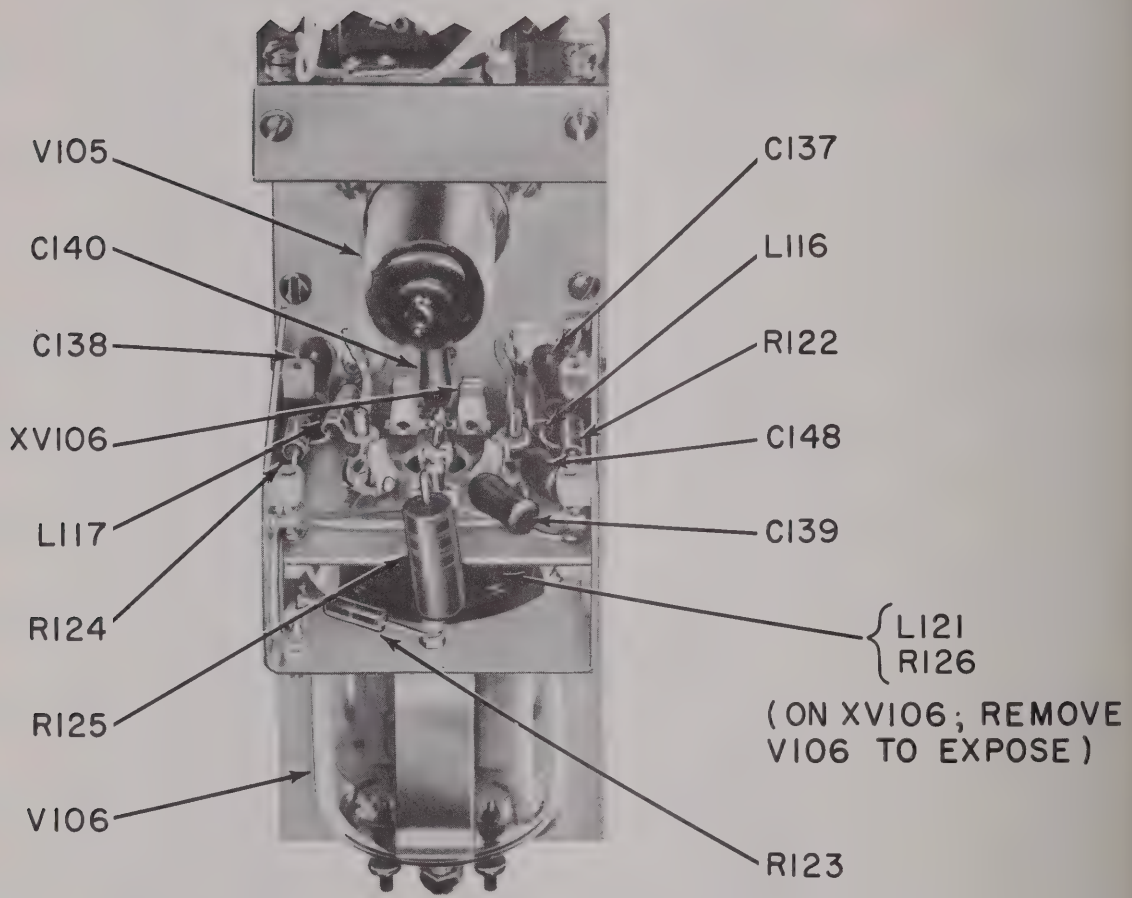
TP1198C



NOTE: SEE FIG. 6-15 FOR LOCATION OF C110, C113, L104, L105, L106, L107, R108, R109, R110, R112, R113, AND R114.

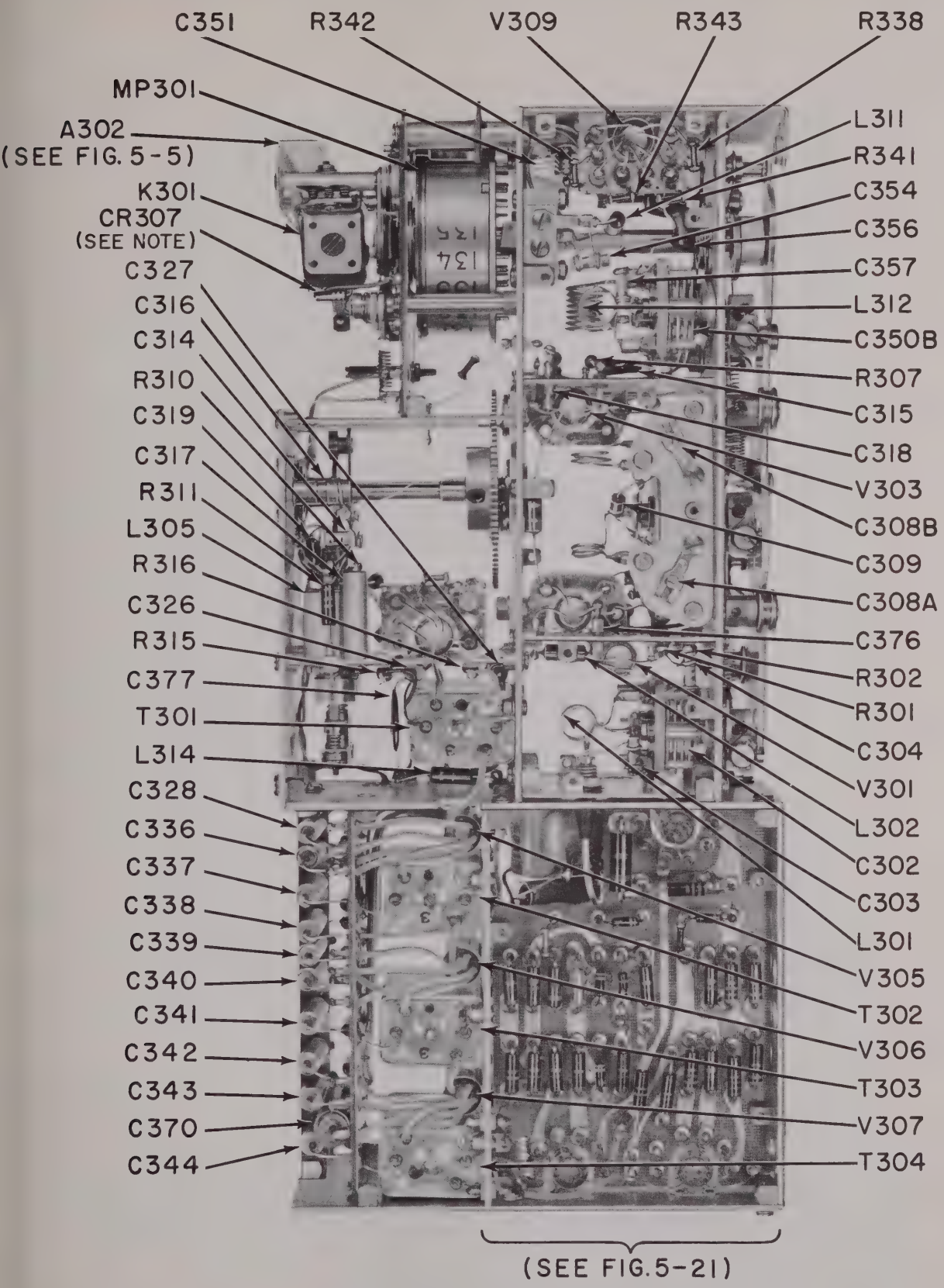
Figure 5–18. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Right Side View

TP1230



TP1232

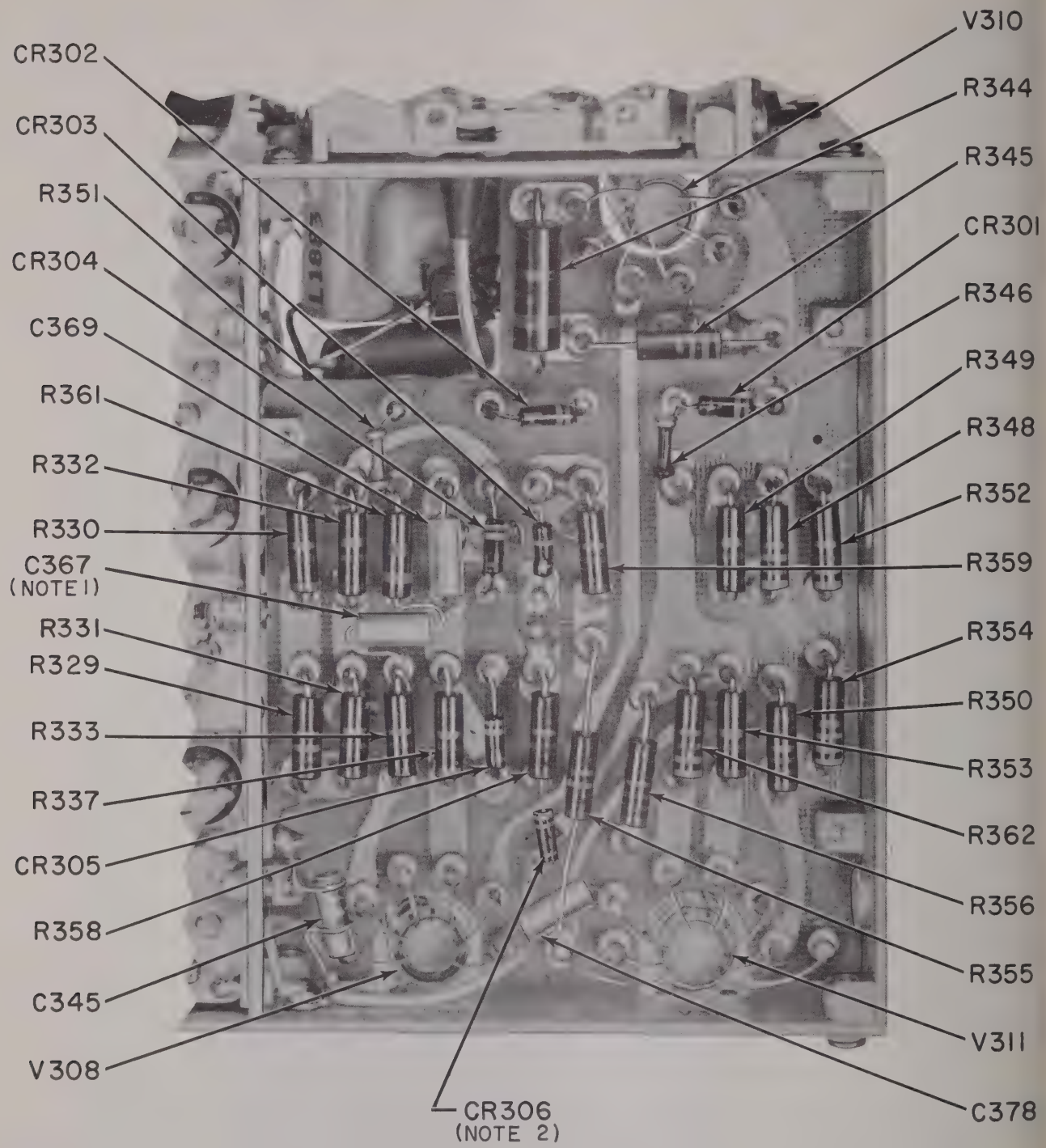
Figure 5–19. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Top View, P.A. Cover Removed



NOTE: CR307 ADDED IN M-6 THROUGH M-9 UNITS, DELETED IN M-10 UNITS.

TP1234C

Figure 5–20. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Left Side View, R-f Covers Removed

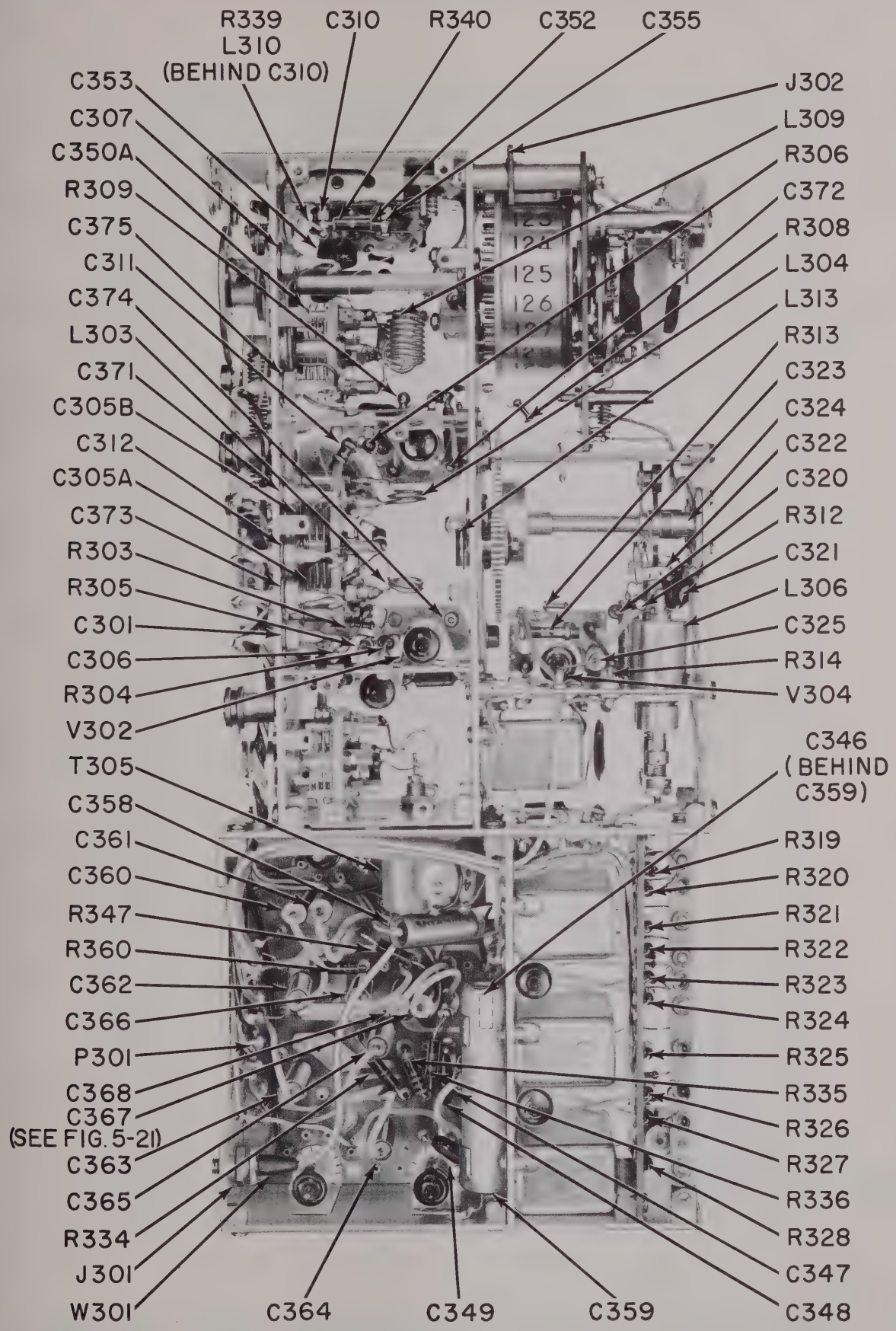


NOTES:

1. IN M-1 THROUGH M-6 UNITS, C367 WAS LOCATED AS SHOWN ON FIGURE 5-22. IN M-7 AND HIGHER UNITS, C367 WAS CHANGED AND RELOCATED AS SHOWN. IN SOME M-7 UNITS, PARALLELED CAPACITORS WERE USED IN THE OLD AND NEW LOCATIONS TO OBTAIN THE NEW VALUE.
2. CR306 ADDED IN M-6 AND HIGHER UNITS.

TP1236A

Figure 5-21. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, A-f Panel Assembly, Bottom View



TP1238 A

Figure 5–22. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Right Side View, R-f Covers Removed

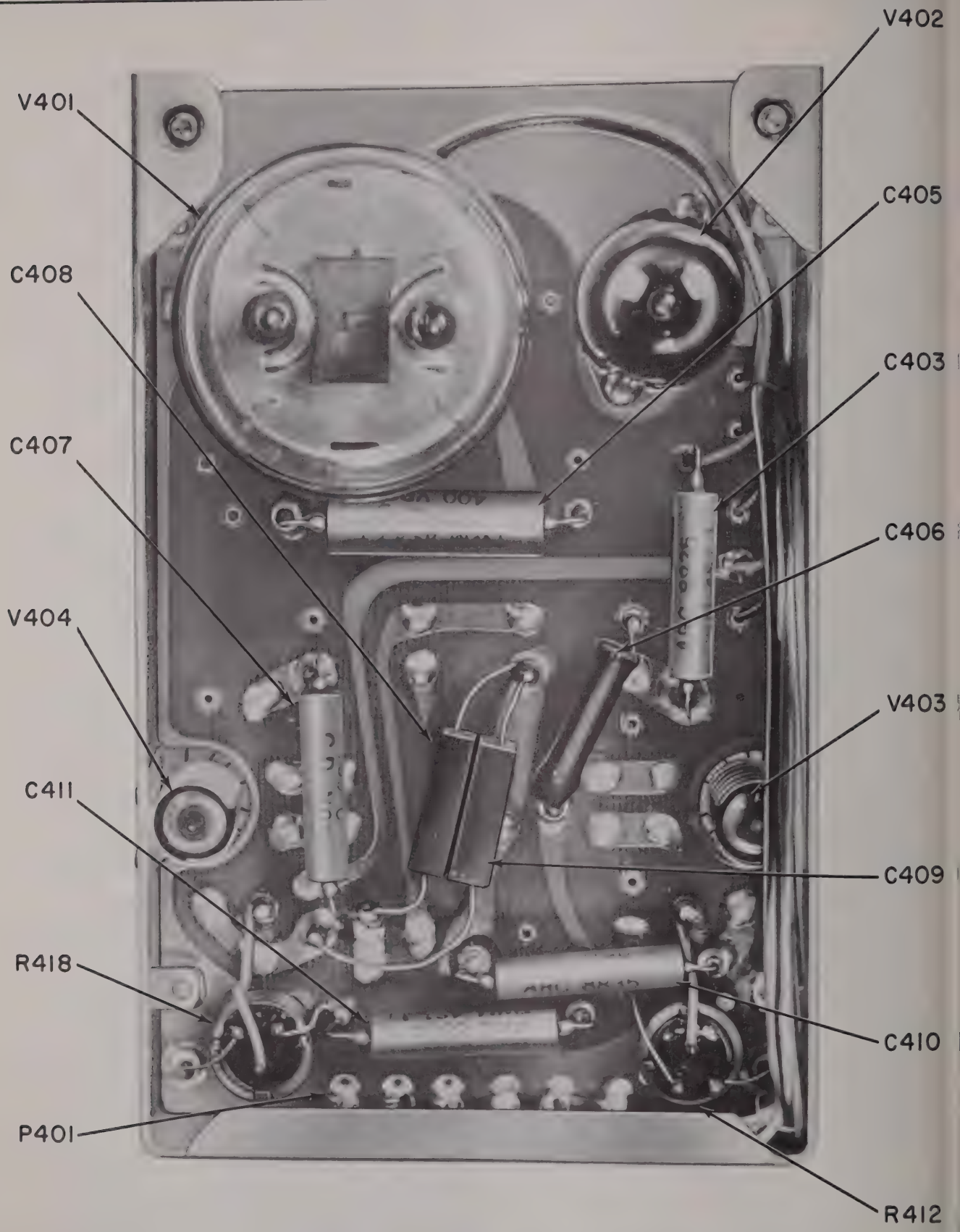
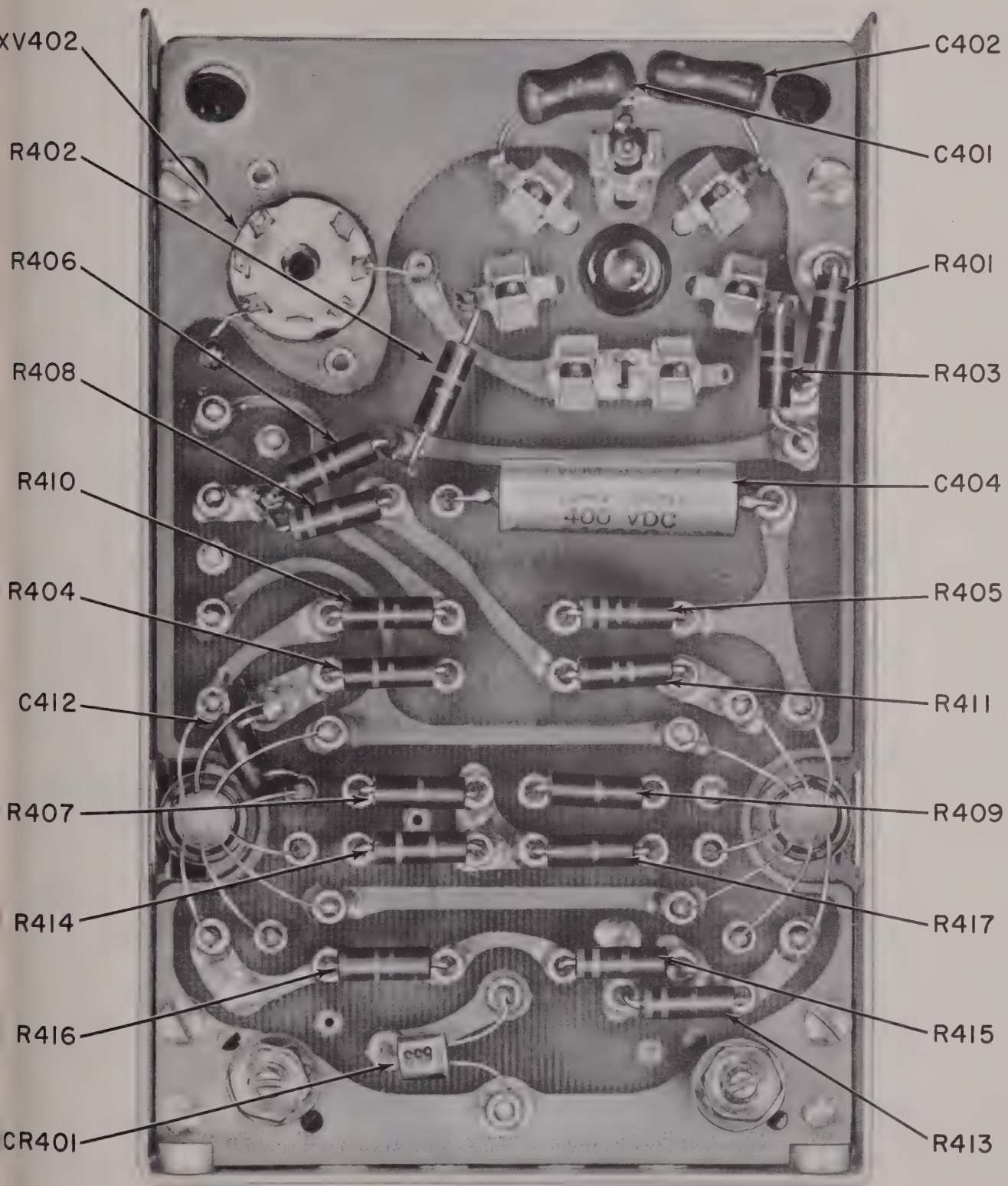
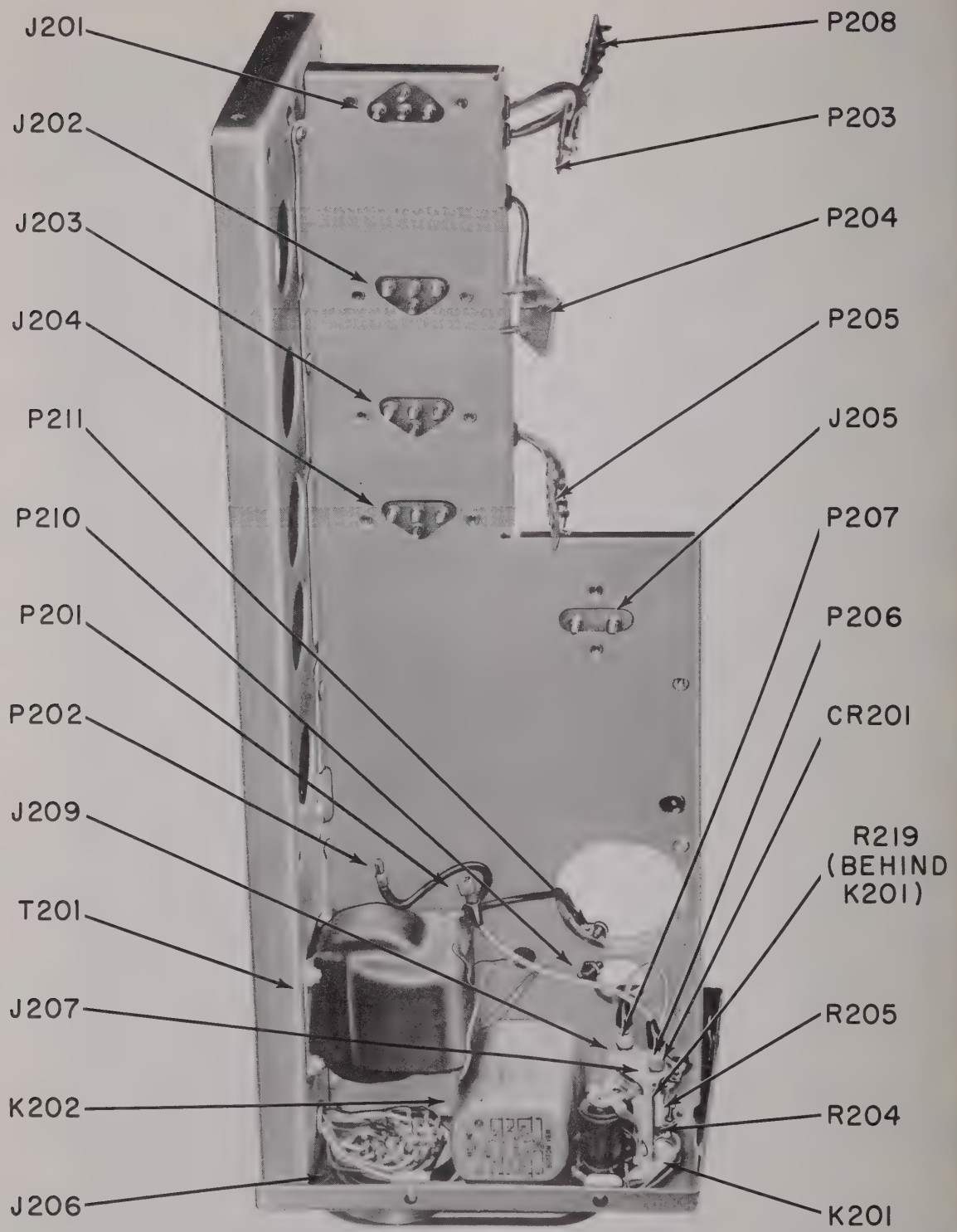


Figure 5–23. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Top View



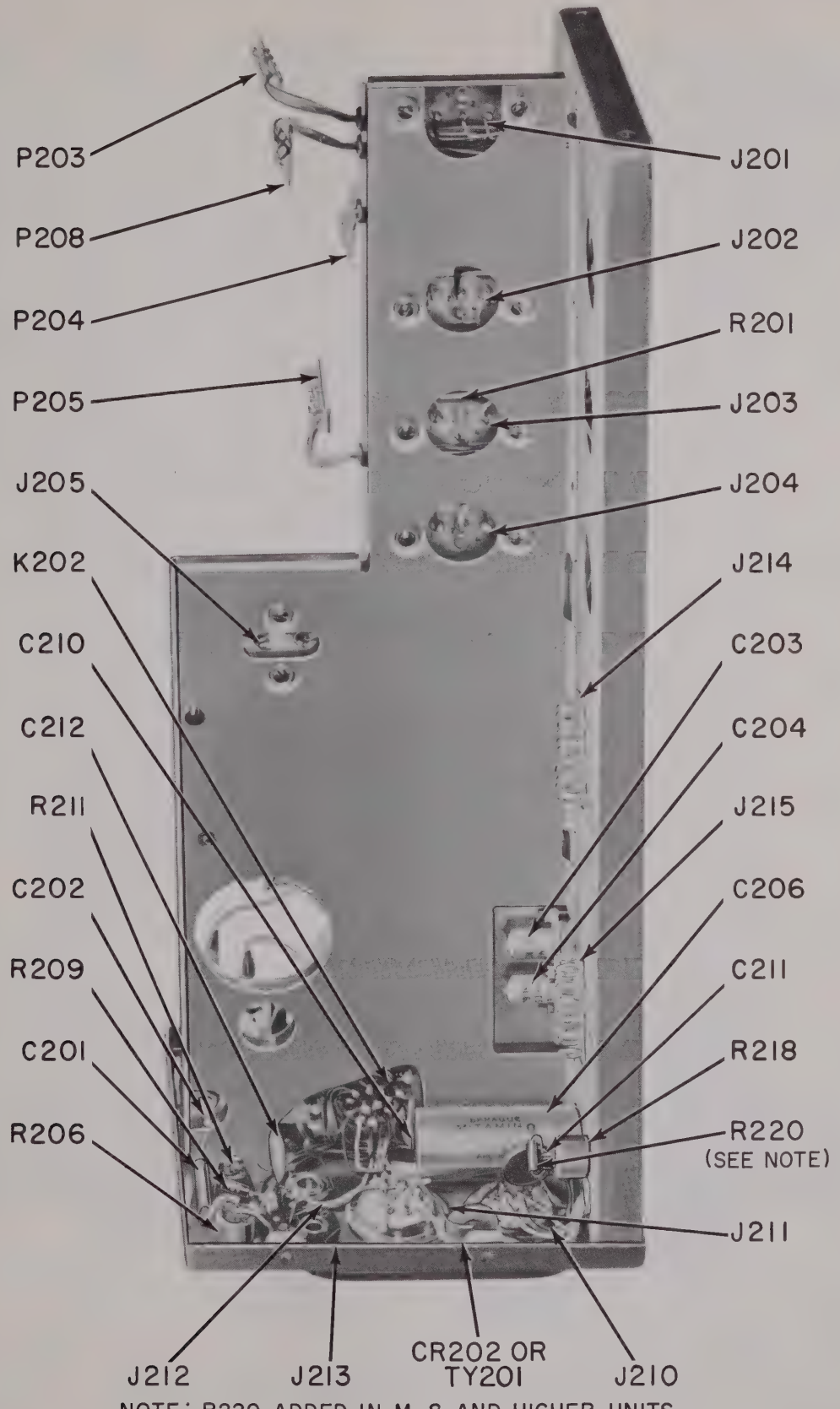
TP1242

Figure 5–24. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Bottom View



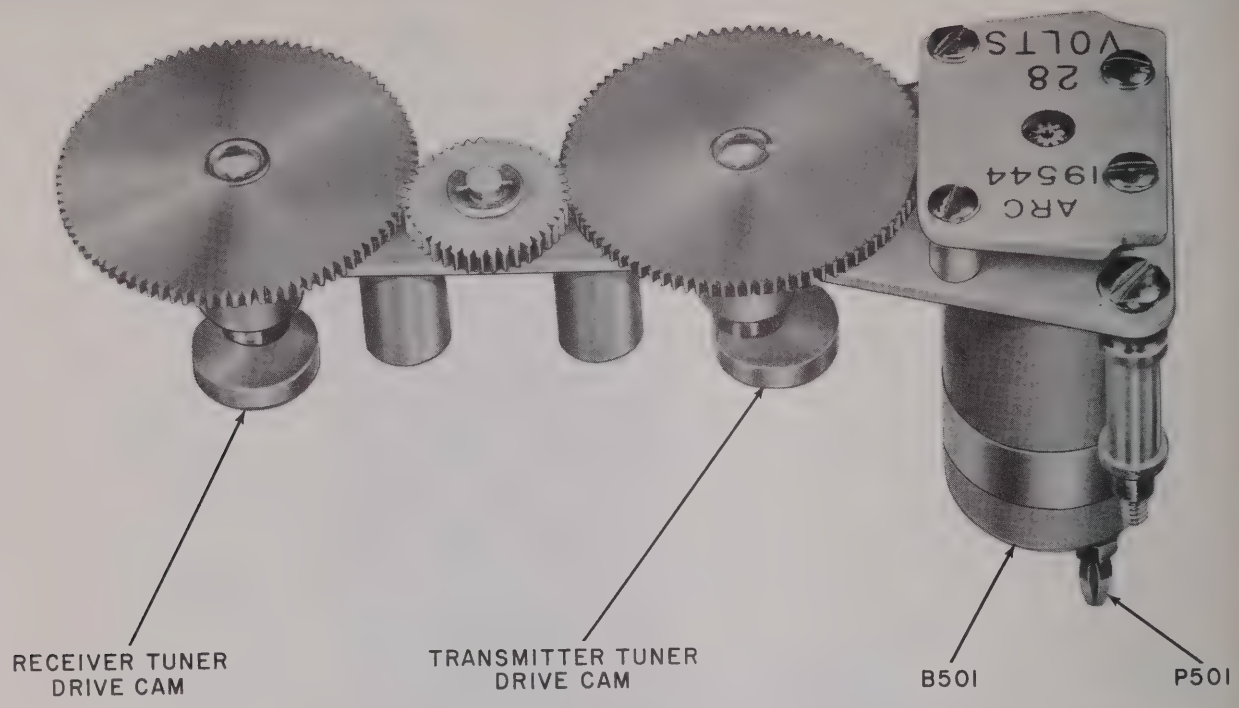
TP124

Figure 5–25. ARC Type RT-11A Receiver-Transmitter, Chassis Assembly, Left Side View



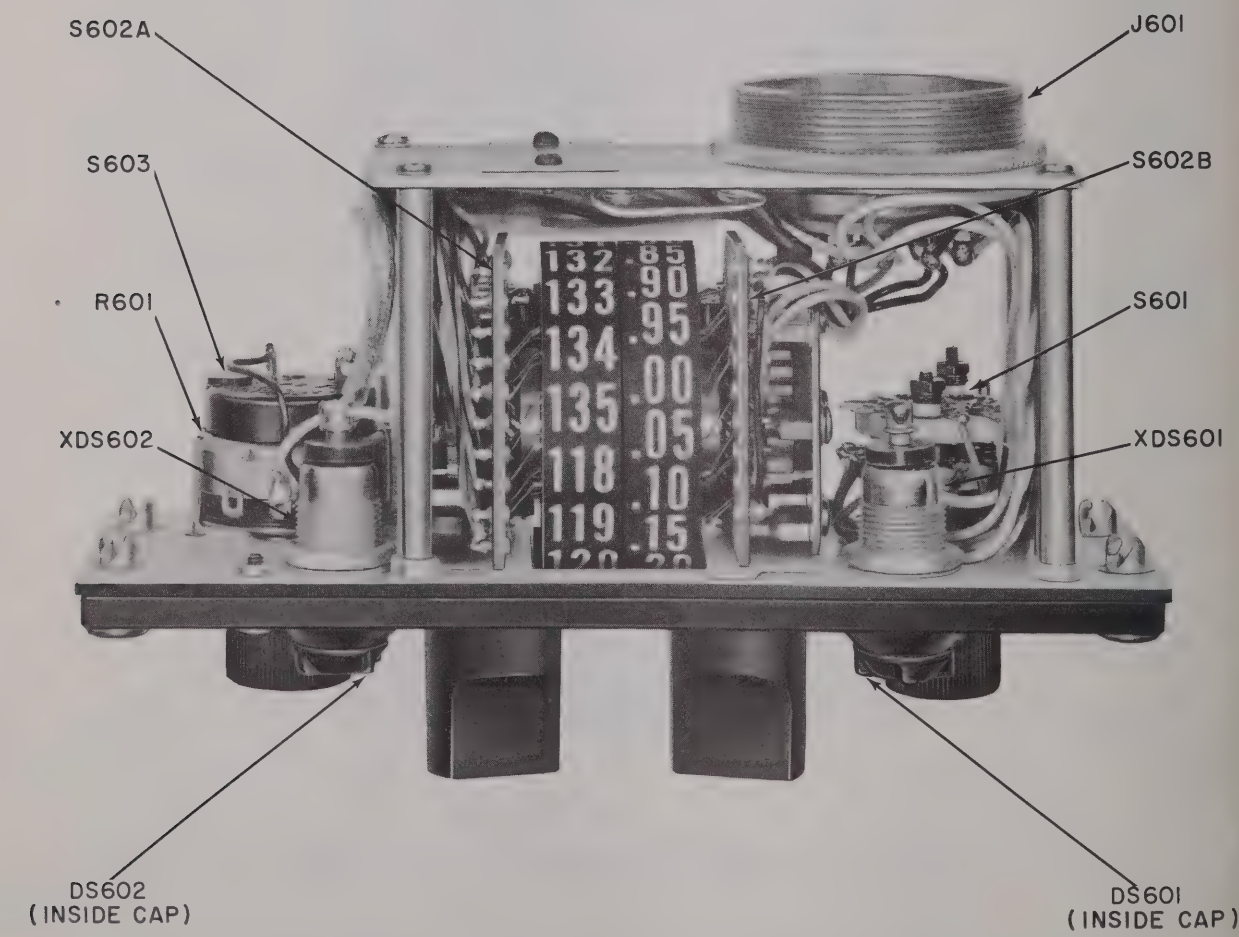
TP1246C

Figure 5–26. ARC Type RT-11A Receiver-Transmitter, Chassis Assembly, Right Side View



TP12

Figure 5–27. ARC Type RT-11A Receiver-Transmitter, Gearing Assembly, Top View



TP1

Figure 5–28. ARC Type C-67A Control Unit, Interior View

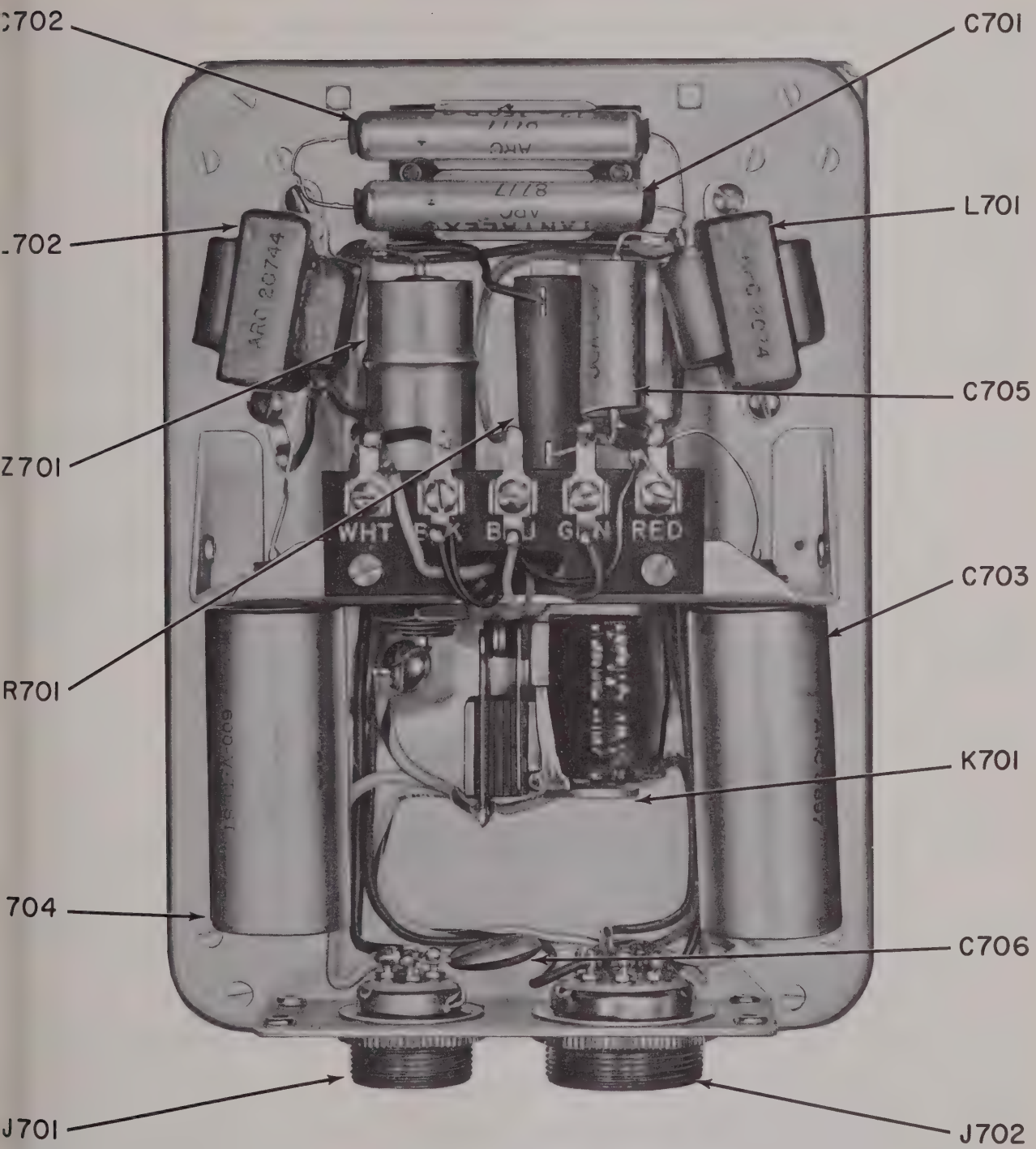


Figure 5–29. ARC Type P-15A Power Unit, Top Interior View

TP1252

SECTION VI
DIAGRAMS

Figure 6–1. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-1 through M-5 Units)

Figure 6–1A. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-6 through M-8 Units)

Figure 6–1B. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-9 and M-10 Units)

Figure 6–2. ARC Type RT-11A Receiver-Transmitter, Wiring Diagram (M-1 through M-8 Units)

Figure 6–2A. ARC Type RT-11A Receiver-Transmitter, Wiring Diagram (M-9 and M-10 Units)

Figure 6–3. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Wiring Diagram

Figure 6–4. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Lower R-f Frame, Wiring Diagram

Figure 6–5. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, R-f Cascode Amplifier, Wiring Diagram

Figure 6–6. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, First Mixer, Wiring Diagram

Figure 6–7. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Megacycle Crystal Oscillator-Doubler, Wiring Diagram

Figure 6–8. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Second Mixer, Wiring Diagram

Figure 6–9. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, Wiring Diagram

Figure 6–10. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, A-f Printed-circuit Assembly, Wiring Diagram

Figure 6–11. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, I-f Resistor Printed-circuit Assembly, Wiring Diagram

Figure 6–12. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Wiring Diagram

Figure 6–13. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Megacycle Crystal Oscillator-Doubler, Wiring Diagram

Figure 6–14. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Tuner Assembly, Wiring Diagram

Figure 6–15. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Fractional Megacycle Oscillator-Balanced Mixer, Wiring Diagram

Figure 6–16. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, R-f Amplifier, Wiring Diagram

Figure 6–17. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Wiring Diagram

Figure 6–18. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Panel Assembly, Wiring Diagram

Figure 6–19. ARC Type C-67A Control Unit, Schematic Diagram

Figure 6–20. ARC Type C-67A Control Unit, Wiring Diagram

Figure 6–21. Continuity Sequence Table for C-67A Channel Selector Switches S602A and S602B

Figure 6–22. ARC Type P-15A Power Unit, Schematic Diagram

Figure 6–23. ARC Type P-15A Power Unit, Wiring Diagram

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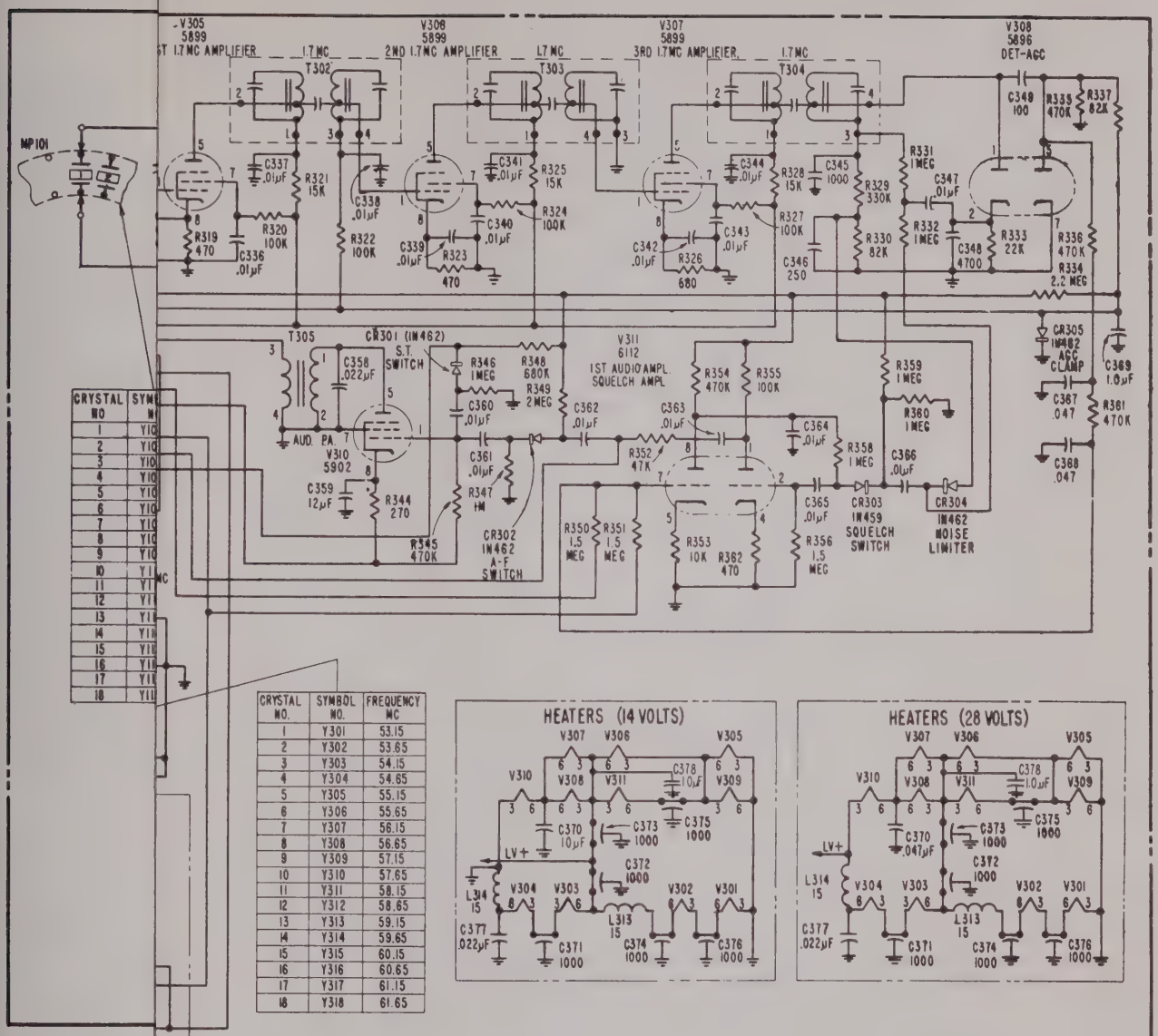

CRYSTAL NO.	SYMBOL NO.	FREQUENCY MC
1	Y301	53.15
2	Y302	53.65
3	Y303	54.15
4	Y304	54.65
5	Y305	55.15
6	Y306	55.65
7	Y307	56.15
8	Y308	56.65
9	Y309	57.15
10	Y310	57.65
11	Y311	58.15
12	Y312	58.65
13	Y313	59.15
14	Y314	59.65
15	Y315	60.15
16	Y316	60.65
17	Y317	61.15
18	Y318	61.65

NOTES:

1. FOR MAI
AS FOLL
2. CAPACIT
3. RESISTAN
4. INDUCTA
5. FOR 14-V
OMITTED
6. FOR 28-V
OMITTED
7. RELAYS
8. CONNECT
9. CAPACIT
OF COMP
10. CRYSTAL
MC POSIT
TABLE I.
CAM-FOL
11. TABLE I
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ATED RE

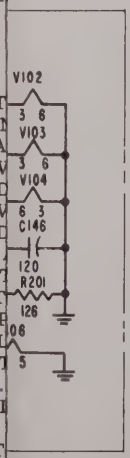


Figure 6–1. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-1 through M-5 Units)

SECTION VI
DIAGRAMS

Figure 6–1. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-1 through M-5 Units)

Figure 6–1A. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-6 through M-8 Units)

Figure 6–1B. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-9 and M-10 Units)

Figure 6–2. ARC Type RT-11A Receiver-Transmitter, Wiring Diagram (M-1 through M-8 Units)

Figure 6–2A. ARC Type RT-11A Receiver-Transmitter, Wiring Diagram (M-9 and M-10 Units)

Figure 6–3. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Wiring Diagram

Figure 6–4. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Lower R-f Frame, Wiring Diagram

Figure 6–5. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, R-f Cascode Amplifier, Wiring Diagram

Figure 6–6. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, First Mixer, Wiring Diagram

Figure 6–7. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Megacycle Crystal Oscillator-Doubler, Wiring Diagram

Figure 6–8. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Second Mixer, Wiring Diagram

Figure 6–9. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, Wiring Diagram

Figure 6–10. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, A-f Printed-circuit Assembly, Wiring Diagram

Figure 6–11. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, I-f Resistor Printed-circuit Assembly, Wiring Diagram

Figure 6–12. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Wiring Diagram

Figure 6–13. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Megacycle Crystal Oscillator-Doubler, Wiring Diagram

Figure 6–14. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Tuner Assembly, Wiring Diagram

Figure 6–15. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Fractional Megacycle Oscillator-Balanced Mixer, Wiring Diagram

Figure 6–16. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, R-f Amplifier, Wiring Diagram

Figure 6–17. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Wiring Diagram

Figure 6–18. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Panel Assembly, Wiring Diagram

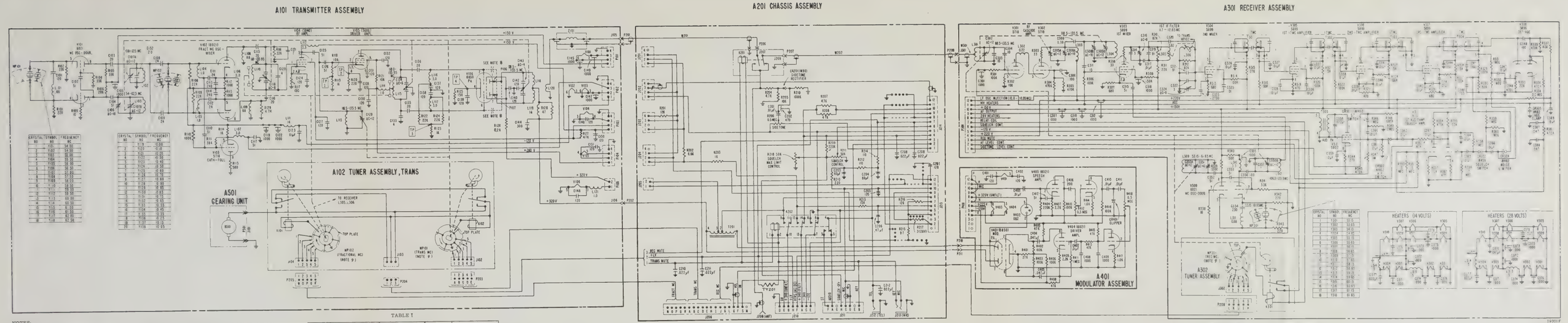
Figure 6–19. ARC Type C-67A Control Unit, Schematic Diagram

Figure 6–20. ARC Type C-67A Control Unit, Wiring Diagram

Figure 6–21. Continuity Sequence Table for C-67A Channel Selector Switches S602A and S602B

Figure 6–22. ARC Type P-15A Power Unit, Schematic Diagram

Figure 6–23. ARC Type P-15A Power Unit, Wiring Diagram



NOTES:

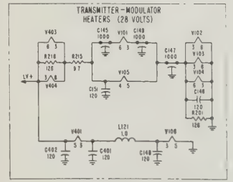
1. FOR MAIN CHASSIS WIRING DIAGRAM, SEE FIGURE 6-2. ASSOCIATED WIRING DIAGRAMS ARE AS FOLLOWS

SYMBOL NO.	ASSEMBLY	FIGURE NO.
A101	TRANSMITTER	6-12
A301	RECEIVER	6-3
A401	MODULATOR	6-17

2. CAPACITANCE VALUES ARE IN MICROMICROFARADS (μμF), UNLESS OTHERWISE NOTED
3. RESISTANCE VALUES ARE IN OHMS. MULTIPLIERS: K = 1000, MEG = 1 000 000.
4. INDUCTANCE VALUES ARE IN MICROHENRIES (μH), UNLESS OTHERWISE NOTED.
5. FOR 14-VOLT UNIT, WIRES MARKED •••••• ARE CONNECTED AND WIRES MARKED ++++ ARE OMITTED.
6. FOR 28-VOLT UNIT, WIRES MARKED + + + ARE CONNECTED AND WIRES MARKED •••••• ARE OMITTED.
7. RELAYS ARE SHOWN IN UNENERGIZED POSITIONS.
8. CONNECTIONS ARE SHOWN TO WIRED SIDE OF RECEPTACLES.
9. CAPACITORS SHOWN ⊣⊢ ARE NEUTRALIZING CAPACITANCE OBTAINED BY PLACEMENT OF COMPONENTS.
10. CRYSTAL DRUMS MP101, MP102, AND MP301 ARE SHOWN IN THE .00-MC, 118-MC, AND 118-MC POSITIONS RESPECTIVELY (TOP VIEW). FOR POSITION-CONTROL CIRCUITING, SEE TABLE 1. THERE ARE TWO UNUSED POSITIONS OF THE MEGACYCLE DRUMS TO ALLOW FOR CAM-FOLLOWER RETURN.
11. TABLE I SHOWS GROUNDED TERMINALS OF J206 VS. CRYSTAL DRUM POSITIONS. UNTABULATED TERMINALS OF INDICATED GROUPS ARE CONNECTED TOGETHER AND TO ASSOCIATED RELAYS.

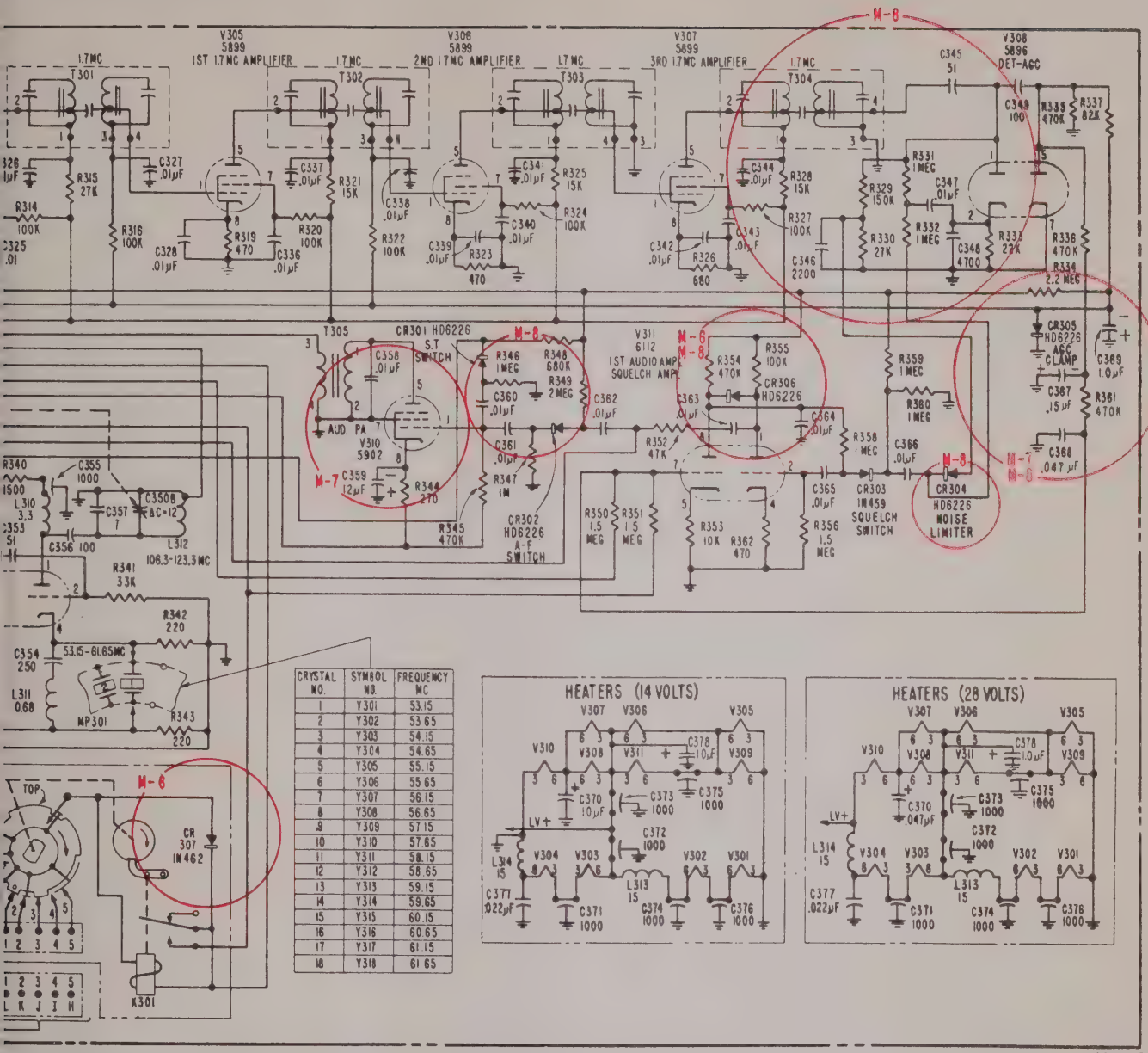
TABLE 1

DIAL →	MP301 J206 (H, T, J, K, L)	MP101 J206 (A, B, C, D, E)	DIAL →	MP102 J206 (N, O, P, Q, R)
118	H, K	C, E	.00	N, O
119	H, T, J, L	A, D	.10	N, R
120	H, T, J, K	A, B, E	.20	Q
121	T, J, K, L	B, C	.30	P
122	J, K, L	C, D	.40	O
123	K, L	D, E	.50	N
124	H, L	E	.60	R
125	I	A	.70	Q, R
126	J	B	.80	P, Q
127	K	C	.90	O, P
128	L	D	.95	N, O, R
129	H	A, E	.85	N, Q
130	H, I	A, B	.75	P, R
131	I, J	A, B, C	.65	O, Q
132	J, K	A, B, C, D	.55	N, P, R
133	H, K, L	B, C, D, E	.45	O, Q, R
134	I, L	A, C, D, E	.35	N, P, Q, R
135	H, J	B, D, E	.25	O, P, Q, R
	I, K	A, C, E	.15	N, O, P, Q
	H, J, L	B, D	.05	N, O, P



SIMPLIFIED SCHEMATICS OF TRANSMITTER-MODULATOR HEATER CONNECTIONS

Figure 6-1. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-1 through M-5 Units)



CRYSTAL NO.	SYMBOL NO.	FREQUENCY MC
1	Y301	53.15
2	Y302	53.65
3	Y303	54.15
4	Y304	54.65
5	Y305	55.15
6	Y306	55.65
7	Y307	56.15
8	Y308	56.65
9	Y309	57.15
10	Y310	57.65
11	Y311	58.15
12	Y312	58.65
13	Y313	59.15
14	Y314	59.65
15	Y315	60.15
16	Y316	60.65
17	Y317	61.15
18	Y318	61.65

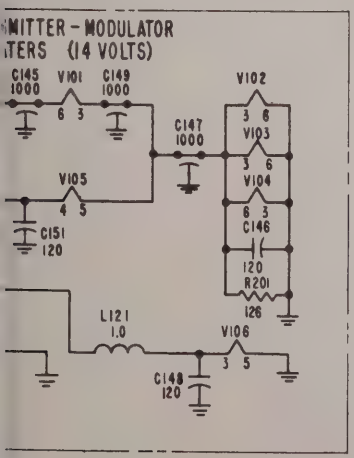
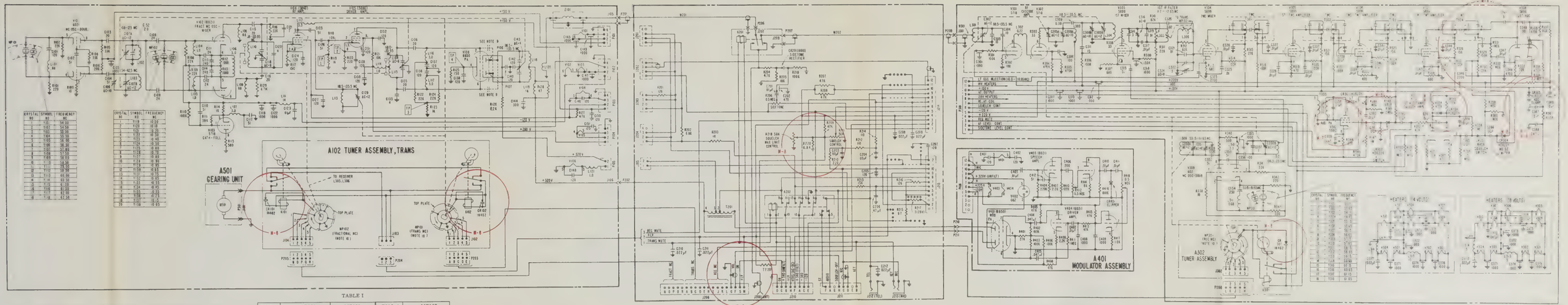


Figure 6–1A. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-6 through M-8 Units)



NOTES:

1. FOR MAIN CHASSIS WIRING DIAGRAM, SEE FIGURE 6-2. ASSOCIATED WIRING DIAGRAMS ARE AS FOLLOWS

SYMBOL NO.	ASSEMBLY	FIGURE NO.
A101	TRANSMITTER	6-12
A301	RECEIVER	6-3
A401	MODULATOR	6-17

2. CAPACITANCE VALUES ARE IN MICROMICROFARADS (μμF) UNLESS OTHERWISE NOTED.
3. RESISTANCE VALUES ARE IN OHMS. MULTIPLIERS: K = 1000; MEG = 1,000,000.
4. INDUCTANCE VALUES ARE IN MICROHENRIES (μH), UNLESS OTHERWISE NOTED.
5. FOR 14-VOLT UNIT, WIRES MARKED ++++ ARE CONNECTED AND WIRES MARKED ++++ ARE OMITTED.
6. FOR 28-VOLT UNIT, WIRES MARKED + + + + ARE CONNECTED AND WIRES MARKED ++++++ ARE OMITTED.
7. RELAYS ARE SHOWN IN UNENERGIZED POSITIONS.
8. CONNECTIONS ARE SHOWN TO WIRED SIDE OF RECEPTACLES.
9. CAPACITORS SHOWN ⊣⊢ ARE NEUTRALIZING CAPACITANCE OBTAINED BY PLACEMENT OF COMPONENTS.
10. CRYSTAL DRUMS MP101, MP102, AND MP301 ARE SHOWN IN THE .00-MC, 118-MC, AND 118-MC POSITIONS, RESPECTIVELY (TOP VIEW). FOR POSITION-CONTROL CIRCUITING, SEE TABLE I. THERE ARE TWO UNUSED POSITIONS OF THE MEGACYCLE DRUMS TO ALLOW FOR CAM-FOLLOWER RETURN.
11. TABLE I SHOWS GROUNDED TERMINALS OF J206 VS. CRYSTAL DRUM POSITIONS. UNTABULATED TERMINALS OF INDICATED GROUPS ARE CONNECTED TOGETHER AND TO ASSOCIATED RELAYS.

TABLE I

DIAL ←	MP301 J206 (H, I, J, K, L)	MP101 J206 (A, B, C, D, E)	DIAL →	MP102 J206 (N, O, P, Q, R)
118	H, I, K	C, E	.00	N, O
119	H, I, J, L	A, D	.10	N, R
120	H, I, J, K	A, B, E	.20	Q
121	I, J, K, L	B, C	.30	P
122	J, K, L	C, D	.40	O
123	K, L	D, E	.50	N
124	H, L	E	.60	R
125	I	A	.70	Q, R
126	J	B	.80	P, Q
127	K	C	.90	O, P
128	L	D	.95	N, O, R
129	H	A, E	.85	N, Q
130	H, I	A, B	.75	P, R
131	I, J	A, B, C	.65	O, Q
132	J, K	A, B, C, D	.55	N, P, R
133	H, K, L	B, C, D, E	.45	O, Q, R
134	I, L	A, C, D, E	.35	N, P, Q, R
135	H, J	B, D, E	.25	O, P, Q, R
—	I, K	A, C, E	.15	N, O, P, Q
—	H, J, L	B, D	.05	N, O, P

M-6, M-7, M-8 DIFFERENCES

SEE FIGURE 6-1 FOR SCHEMATIC DIAGRAM OF RT-11A FOR M-1 THROUGH M-5 UNITS. IN COMPARISON WITH EARLIER UNITS, M-6, M-7, AND M-8 DIFFERENCES ARE CIRCLED IN RED ON THIS DIAGRAM AND CONSIST OF THE FOLLOWING:

M-6: CR101, CR102, CR306, AND CR307 ADDED.

JUMPER WIRE FROM PIN M OF J206 ADDED.

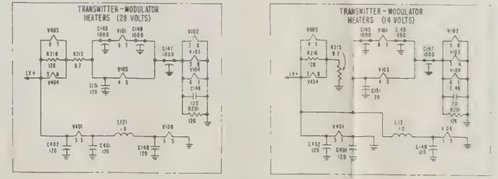
M-7: VALUE OF C358 CHANGED FROM .022 μF TO .01 μF.

VALUE OF C367 CHANGED FROM 0.47 μF TO 0.15 μF.

M-8: DETECTOR CIRCUIT CHANGED FROM SERIES-TYPE TO SHUNT-TYPE AS FOLLOWS: C345 CHANGED FROM 1000 μμF TO 51 μμF AND RELOCATED; R329 CHANGED FROM 330K TO 150K; R330 CHANGED FROM 82K TO 27K; C346 CHANGED FROM 250 μμF TO 2200 μμF; WIRING CHANGED AS REQUIRED FOR SHUNT-TYPE DETECTOR.

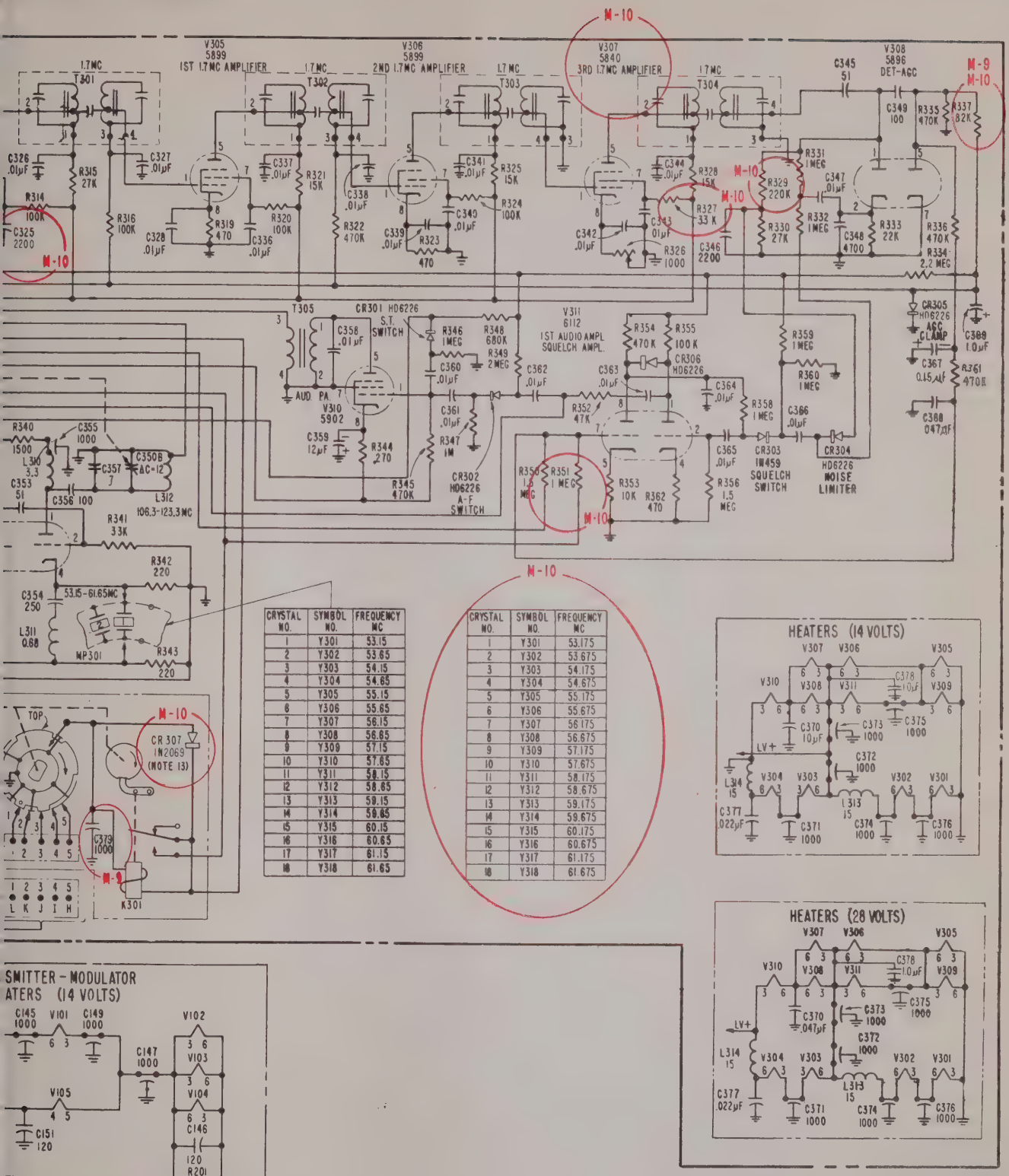
SQUELCH CIRCUIT CHANGED AS FOLLOWS: R209 CHANGED FROM 220K TO 47K, 2 WATT, AND R220 (6800 OHMS) ADDED.

CR301, CR302, CR304, AND CR305 WERE TYPE 1N462 AND CR306 WAS TYPE 1N459.



SIMPLIFIED SCHEMATICS OF TRANSMITTER-MODULATOR HEATER CONNECTIONS

Figure 6-1A. ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-6 through M-8 Units)



CRYSTAL NO.	SYMBOL NO.	FREQUENCY MC
1	Y301	53.15
2	Y302	53.65
3	Y303	54.15
4	Y304	54.65
5	Y305	55.15
6	Y306	55.65
7	Y307	56.15
8	Y308	56.65
9	Y309	57.15
10	Y310	57.65
11	Y311	58.15
12	Y312	58.65
13	Y313	59.15
14	Y314	59.65
15	Y315	60.15
16	Y316	60.65
17	Y317	61.15
18	Y318	61.65

M-10

CRYSTAL NO.	SYMBOL NO.	FREQUENCY MC
1	Y301	53.175
2	Y302	53.675
3	Y303	54.175
4	Y304	54.675
5	Y305	55.175
6	Y306	55.675
7	Y307	56.175
8	Y308	56.675
9	Y309	57.175
10	Y310	57.675
11	Y311	58.175
12	Y312	58.675
13	Y313	59.175
14	Y314	59.675
15	Y315	60.175
16	Y316	60.675
17	Y317	61.175
18	Y318	61.675

Figure 6–1B, ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-9 and M-10 Units)

NOTES:

1. FOR MAIN CHASSIS WIRING DIAGRAM, SEE FIGURE 6-2A. ASSOCIATED WIRING DIAGRAMS ARE AS FOLLOWS:

SYMBOL NO.	ASSEMBLY	FIGURE NO.
A101	TRANSMITTER	6-12
A301	RECEIVER	6-3
A401	MODULATOR	6-17

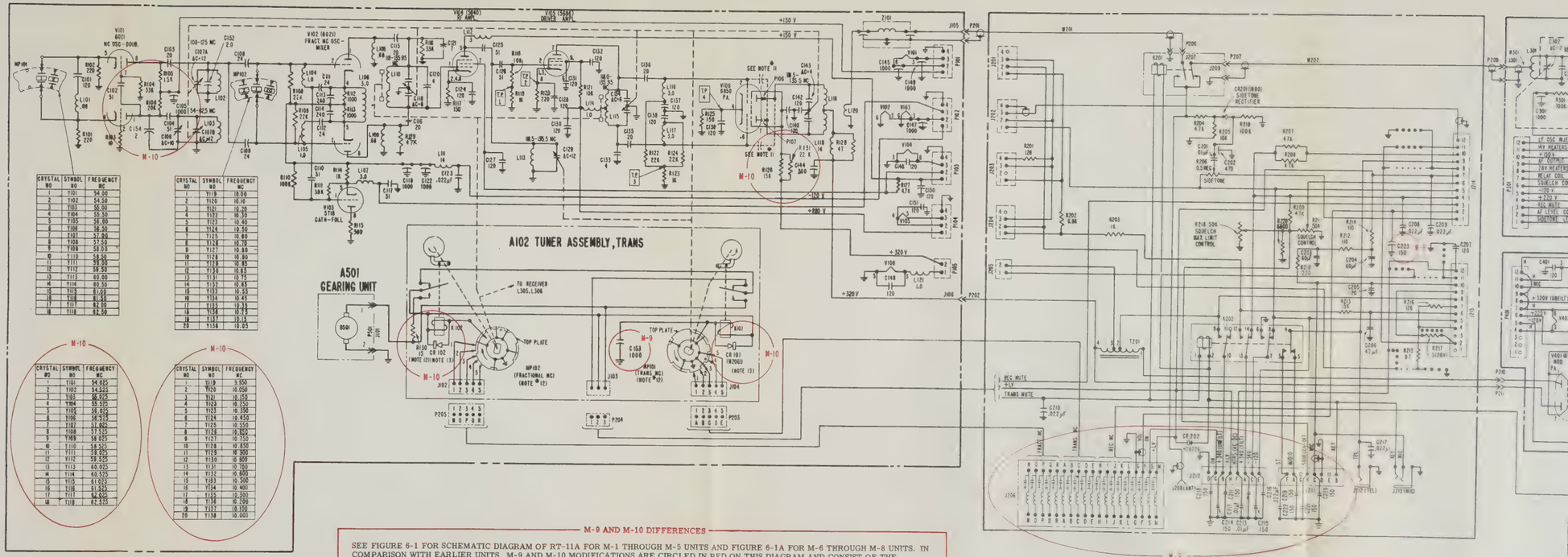
2. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F), UNLESS OTHERWISE NOTED.
3. RESISTANCE VALUES ARE IN OHMS. MULTIPLIERS: K = 1000; MEG = 1,000,000.
4. INDUCTANCE VALUES ARE IN MICROHENRIES (μH), UNLESS OTHERWISE NOTED.
5. FOR 14-VOLT UNIT, WIRES MARKED •••••• ARE CONNECTED AND WIRES MARKED++++ ARE OMITTED.
6. FOR 28-VOLT UNIT, WIRES MARKED++++ ARE CONNECTED AND WIRES MARKED •••••• ARE OMITTED.
7. RELAYS ARE SHOWN IN UNENERGIZED POSITIONS.
8. CONNECTIONS ARE SHOWN TO WIRED SIDE OF RECEPTACLES.
9. CAPACITORS SHOWN --||-- ARE NEUTRALIZING CAPACITANCE OBTAINED BY PLACEMENT OF COMPONENTS.
10. CRYSTAL DRUMS MP101, MP102, AND MP301 ARE SHOWN IN THE .00-MC, 118-MC, AND 118-MC POSITIONS, RESPECTIVELY (TOP VIEW). FOR POSITION-CONTROL CIRCUITING, SEE TABLE I. THERE ARE TWO UNUSED POSITIONS OF THE MEGACYCLE DRUMS TO ALLOW FOR CAM-FOLLOWER RETURN.
11. TABLE I SHOWS GROUNDED TERMINALS OF J206 VS. CRYSTAL DRUM POSITIONS. UNTABULATED TERMINALS OF INDICATED GROUPS ARE CONNECTED TOGETHER AND TO ASSOCIATED RELAYS.

TABLE I

DIAL →	MP301 J206 (H, I, J, K, L)	MP101 J206 (A, B, C, D, E)	DIAL →	MP102 J206 (N, O, P, Q, R)
118	H, I, K	C, E	.00	N, O
119	H, I, J, L	A, D	.10	N, R
120	H, I, J, K	A, B, E	.20	Q
121	I, J, K, L	B, C	.30	P
122	J, K, L	C, D	.40	O
123	K, L	D, E	.50	N
124	H, L	E	.60	R
125	I	A	.70	Q, R
126	J	B	.80	P, Q
127	K	C	.90	O, P
128	L	D	.95	N, O, R
129	H	A, E	.85	N, Q
130	H, I	A, B	.75	P, R
131	I, J	A, B, C	.65	O, Q
132	J, K	A, B, C, D	.55	N, P, R
133	H, K, L	B, C, D, E	.45	O, Q, R
134	I, L	A, C, D, E	.35	N, P, Q, R
135	H, J	B, D, E	.25	O, P, Q, R
	I, K	A, C, E	.15	N, O, P, Q
	H, J, L	B, D	.05	N, O, P

A101 TRANSMITTER ASSEMBLY

A201 CHASSIS ASSEMBLY



CRYSTAL NO	SYMBOL NO	FREQUENCY MC
1	Y101	54.00
2	Y102	54.50
3	Y103	55.00
4	Y104	55.50
5	Y105	56.00
6	Y106	56.50
7	Y107	57.00
8	Y108	57.50
9	Y109	58.00
10	Y110	58.50
11	Y111	59.00
12	Y112	59.50
13	Y113	60.00
14	Y114	60.50
15	Y115	61.00
16	Y116	61.50
17	Y117	62.00
18	Y118	62.50

CRYSTAL NO	SYMBOL NO	FREQUENCY MC
1	Y119	10.00
2	Y120	10.10
3	Y121	10.20
4	Y122	10.30
5	Y123	10.40
6	Y124	10.50
7	Y125	10.60
8	Y126	10.70
9	Y127	10.80
10	Y128	10.90
11	Y129	10.95
12	Y130	10.85
13	Y131	10.75
14	Y132	10.65
15	Y133	10.55
16	Y134	10.45
17	Y135	10.35
18	Y136	10.25
19	Y137	10.15
20	Y138	10.05

CRYSTAL NO	SYMBOL NO	FREQUENCY MC
1	Y101	54.025
2	Y102	54.525
3	Y103	55.025
4	Y104	55.525
5	Y105	56.025
6	Y106	56.525
7	Y107	57.025
8	Y108	57.525
9	Y109	58.025
10	Y110	58.525
11	Y111	59.025
12	Y112	59.525
13	Y113	60.025
14	Y114	60.525
15	Y115	61.025
16	Y116	61.525
17	Y117	62.025
18	Y118	62.525

CRYSTAL NO	SYMBOL NO	FREQUENCY MC
1	Y119	9.950
2	Y120	10.050
3	Y121	10.150
4	Y122	10.250
5	Y123	10.350
6	Y124	10.450
7	Y125	10.550
8	Y126	10.650
9	Y127	10.750
10	Y128	10.850
11	Y129	10.900
12	Y130	10.800
13	Y131	10.700
14	Y132	10.600
15	Y133	10.500
16	Y134	10.400
17	Y135	10.300
18	Y136	10.200
19	Y137	10.100
20	Y138	10.000

M-9 AND M-10 DIFFERENCES

SEE FIGURE 6-1 FOR SCHEMATIC DIAGRAM OF RT-11A FOR M-1 THROUGH M-5 UNITS AND FIGURE 6-1A FOR M-6 THROUGH M-8 UNITS. IN COMPARISON WITH EARLIER UNITS, M-9 AND M-10 MODIFICATIONS ARE CIRCLED IN RED ON THIS DIAGRAM AND CONSIST OF THE FOLLOWING:

M-9: FILTER NETWORK ADDED TO J206.

C153, C213–C222, C223, C379, AND CR202 ADDED.

VALUE OF R337 CHANGED FROM 82K TO 100K.

IN LATER PRODUCTION, C406 CHANGED FROM 200 $\mu\mu$F to 510 $\mu\mu$F.

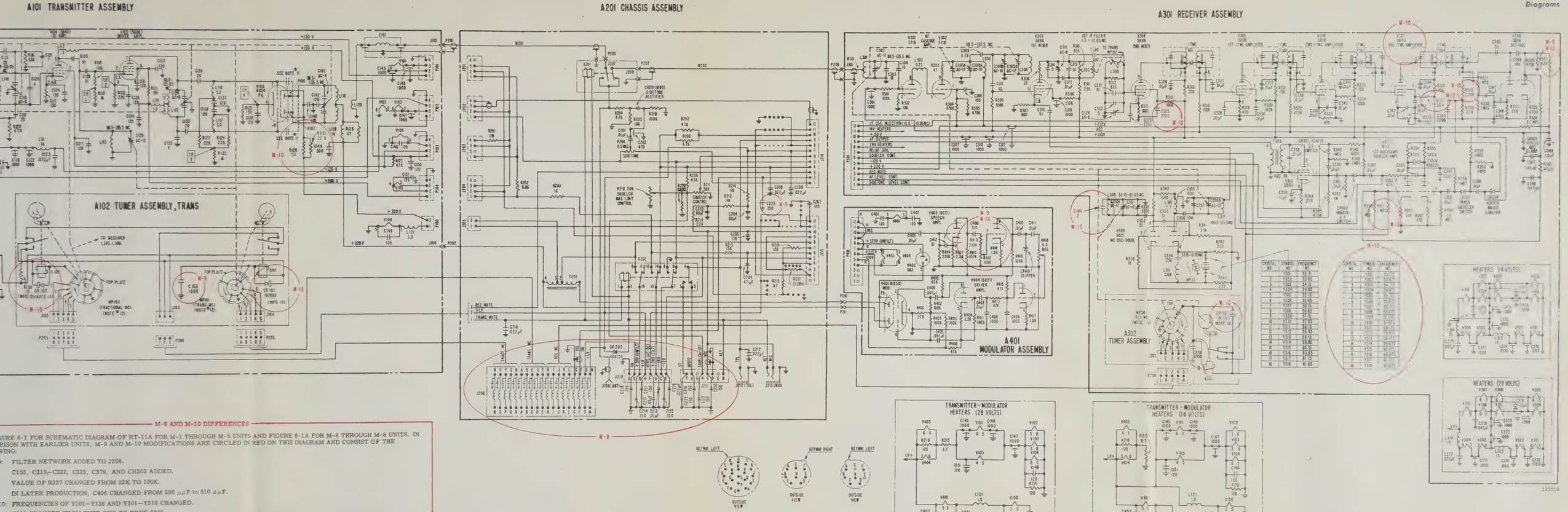
M-10: FREQUENCIES OF Y101–Y138 AND Y301–Y318 CHANGED.

V306 CHANGED FROM TYPE 5899 TO TYPE 5840.

VALUE OF R327 CHANGED FROM 100K TO 33K, R329 FROM 150K TO 220K, AND R337 FROM 100K TO 82K. IN LATER PRODUCTION, C154, C380, R130 (28-VOLT UNITS ONLY), R131, AND R419 ADDED.

IN LATER PRODUCTION, CR101, CR102, AND CR107 REMOVED.

IN LATER PRODUCTION, PART VALUES WERE CHANGED AS FOLLOWS: C325 FROM .01 μF TO 2200 UUF, R105 FROM 33K TO 15K, R126 FROM 8.2K TO 15K, R351 FROM 1.5 MEG TO 1 MEG, AND R412 FROM 500K TO 100K.



SIMPLIFIED SCHEMATICS OF TRANSMITTER-MODULATOR HEATER CONNECTIONS

M-9 AND M-10 DIFFERENCES

GURE 6-1 FOR SCHEMATIC DIAGRAM OF RT-11A FOR M-1 THROUGH M-5 UNITS AND FIGURE 6-1A FOR M-6 THROUGH M-8 UNITS. IN RISON WITH EARLIER UNITS, M-9 AND M-10 MODIFICATIONS ARE CIRCLED IN RED ON THIS DIAGRAM AND CONSIST OF THE WING:

9: FILTER NETWORK ADDED TO J206.

C153, C213,-C222, C223, C379, AND CR202 ADDED.

VALUE OF R337 CHANGED FROM 82K TO 100K.

IN LATER PRODUCTION, C406 CHANGED FROM 200 μμF to 510 μμF.

0: FREQUENCIES OF Y101—Y138 AND Y301—Y318 CHANGED.

V306 CHANGED FROM TYPE 5899 TO TYPE 5840.

VALUE OF R327 CHANGED FROM 100K TO 33K, R329 FROM 150K TO 220K, AND R337 FROM 100K TO 82K. IN LATER PRODUCTION, C154, C380, R130 (28-VOLT UNITS ONLY), R131, AND R419 ADDED.

IN LATER PRODUCTION, CR101, CR102, AND CR107 REMOVED.

IN LATER PRODUCTION, PART VALUES WERE CHANGED AS FOLLOWS: C325 FROM .01 μF TO 2200 UUF, R105 FROM 33K TO 15K, R126 FROM 8.2K TO 15K, R351 FROM 1.5 MEG TO 1 MEG, AND R412 FROM 500K TO 100K.

Figure 6-1B, ARC Type RT-11A Receiver-Transmitter, Schematic Diagram (M-9 and M-10 Units)

NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIG

2. ASSOCIATED WIRING DIAGRAMS OF M
   FOLLOWS:

SYMBOL NO.	ASSEMBLY
A101	TRANSMITTER
A301	RECEIVER
A401	MODULATOR

3. WIRES:

MARKING	
COLOR NOTE	#24 SOLID
COLOR NOTE PLUS (*)	#24 STRAN TION
COLOR NOTE PLUS (22*)	#22 SOLID
COLOR NOTE PLUS (20*)	#20 STRAN TION
COLOR NOTE PLUS (18*)	#18 STRAN TION
UNMARKED	#22 SOLID, EXCEPT AS SHOV

4. WIRES MARKED —⊐— ARE #29 SOLID TEFLON COAXIAL CABLES.

5. FOR 28-VOLT CHASSIS, WIRES MARK AND WIRES MARKED . . . . ARE OMI

6. FOR 14-VOLT CHASSIS, WIRES MARK AND WIRES MARKED + + + + ARE OMI

7. TRANSPARENT VINYLITE TUBING OF STALLED OVER GROUPS OF WIRES M

8. WHEN REQUIRED FOR CLARITY, CO IN MORE THAN ONE VIEW.

9. FOR COMPLETE WIRING, SEE ALL V

10. TEFLON TUBING OF APPROPRIATE S DICATED.

11. JUMPER INDICATED IS SOLDERED TO

12. WIRES OF GROUP INDICATED (—→ NYLON LACING TAPE.

13. IN M-6 AND HIGHER UNITS, WHITE J206 AND R214 WAS ADDED, AND BL D ON J210 WAS TRANSFERRED FRO GROUND LUG NEAR K202.

14. IN M-8 AND HIGHER UNITS, R220 WA

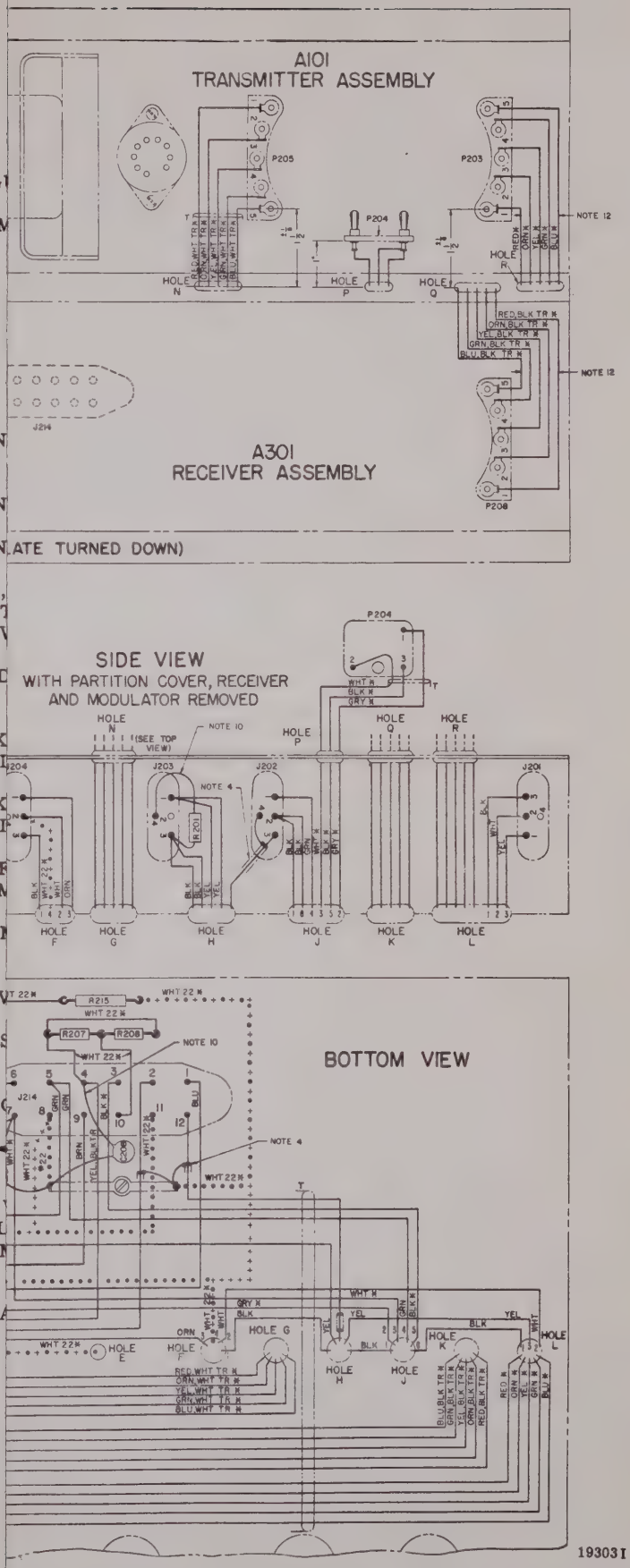


Figure 6–2. ARC Type RT-11A Receiver-Transmitter, Wiring Diagram (M-1 through M-8 Units)

NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6-1 AND 6-1A.

2. ASSOCIATED WIRING DIAGRAMS OF MAJOR ASSEMBLIES ARE AS FOLLOWS:

SYMBOL NO.	ASSEMBLY	FIGURE NO.
A101	TRANSMITTER	6-12
A301	RECEIVER	6-3
A401	MODULATOR	6-17

3. WIRES:

MARKING	DESCRIPTION
COLOR NOTE	#24 SOLID COPPER, TEFLON INSULATION
COLOR NOTE PLUS (*)	#24 STRANDED COPPER, TEFLON INSULATION
COLOR NOTE PLUS (22*)	#22 SOLID COPPER, TEFLON INSULATION
COLOR NOTE PLUS (20*)	#20 STRANDED COPPER, TEFLON INSULATION
COLOR NOTE PLUS (18*)	#18 STRANDED COPPER, VINYL INSULATION
UNMARKED	#22 SOLID, BARE, TINNED COPPER, EXCEPT THOSE MARKED WITH SIZE AS SHOWN

4. WIRES MARKED —⫤⊢— ARE #29 SOLID COPPERWELD MINIATURE TEFLON COAXIAL CABLES.

5. FOR 28-VOLT CHASSIS, WIRES MARKED + + + + ARE CONNECTED AND WIRES MARKED . . . . ARE OMITTED.

6. FOR 14-VOLT CHASSIS, WIRES MARKED . . . . ARE CONNECTED AND WIRES MARKED + + + + ARE OMITTED.

7. TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE IS INSTALLED OVER GROUPS OF WIRES MARKED "T."

8. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.

9. FOR COMPLETE WIRING, SEE ALL VIEWS.

10. TEFLON TUBING OF APPROPRIATE SIZE IS INSTALLED AS INDICATED.

11. JUMPER INDICATED IS SOLDERED TO RECEPTACLE SHELL.

12. WIRES OF GROUP INDICATED (⟶ ⟵) ARE BOUND WITH WAXED NYLON LACING TAPE.

13. IN M-6 AND HIGHER UNITS, WHITE WIRE BETWEEN PIN M OF J206 AND R214 WAS ADDED, AND BLACK #18 WIRE FROM PIN D ON J210 WAS TRANSFERRED FROM PIN D ON J211 TO GROUND LUG NEAR K202.

14. IN M-8 AND HIGHER UNITS, R220 WAS ADDED.

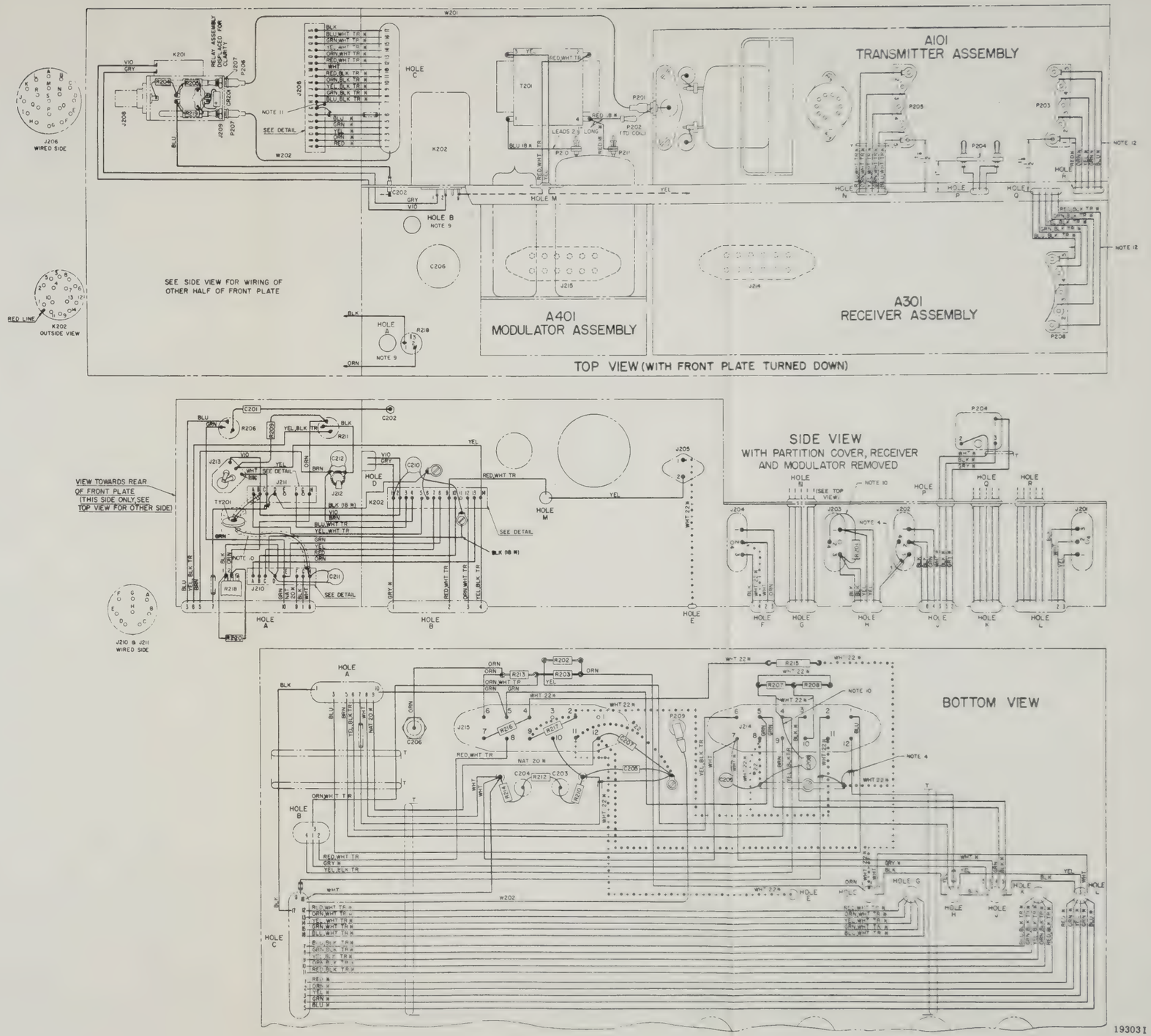

A101
TRANSMITTER ASSEMBLY
A401
MODULATOR ASSEMBLY
A301
RECEIVER ASSEMBLY
TOP VIEW (WITH FRONT PLATE TURNED DOWN)
SEE SIDE VIEW FOR WIRING OF OTHER HALF OF FRONT PLATE
VIEW TOWARDS REAR OF FRONT PLATE (THIS SIDE ONLY, SEE TOP VIEW FOR OTHER SIDE)
SIDE VIEW
WITH PARTITION COVER, RECEIVER AND MODULATOR REMOVED
BOTTOM VIEW
J206 WIRED SIDE
K202 OUTSIDE VIEW
J210 & J211 WIRED SIDE
19303I

Figure 6–2. ARC Type RT-11A Receiver-Transmitter, Wiring Diagram (M-1 through M-8 Units)

NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGU

2. ASSOCIATED WIRING DIAGRAMS OF M
   FOLLOWS:

SYMBOL NO.	ASSEMBLY
A101	TRANSMITTER
A301	RECEIVER
A401	MODULATOR

3. WIRES:

MARKING	
COLOR NOTE	#24 SOLID C
COLOR NOTE PLUS (*)	#24 STRAND TION
COLOR NOTE PLUS (22*)	#22 SOLID C
COLOR NOTE PLUS (20*)	#20 STRAND TION
COLOR NOTE PLUS (18*)	#18 STRAND TION
UNMARKED	#22 SOLID, EXCEPT AS SHOW

4. WIRES MARKED —⊖— ARE #29 SOLID TEFLON COAXIAL CABLES.

5. FOR 28-VOLT CHASSIS, WIRES MARKE AND WIRES MARKED . . . . ARE OMIT

6. FOR 14-VOLT CHASSIS, WIRES MARKE AND WIRES MARKED + + + + ARE OMIT

7. TRANSPARENT VINYLITE TUBING OF STALLED OVER GROUPS OF WIRES M

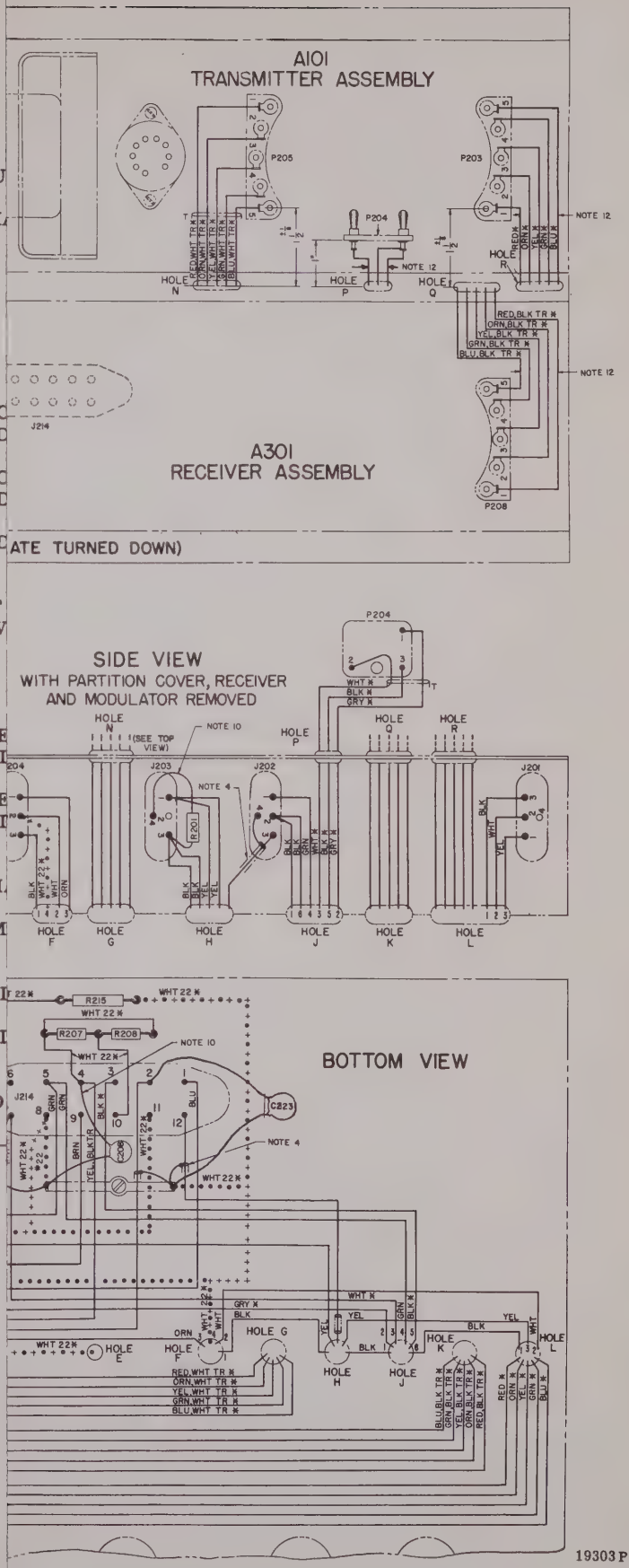
8. WHEN REQUIRED FOR CLARITY, COM IN MORE THAN ONE VIEW.

9. FOR COMPLETE WIRING, SEE ALL VI

10. TEFLON TUBING OF APPROPRIATE SI DICATED.

11. JUMPER INDICATED IS SOLDERED TO

12. WIRES OF GROUP INDICATED (—→ ←— NYLON LACING TAPE.



19303P

Figure 6–2A. ARC Type RT-11A Receiver-Transmitter, Wiring Diagram (M-9 and M-10 Units)

NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6-1B.

2. ASSOCIATED WIRING DIAGRAMS OF MAJOR ASSEMBLIES ARE AS FOLLOWS:

SYMBOL NO.	ASSEMBLY	FIGURE NO.
A101	TRANSMITTER	6-12
A301	RECEIVER	6-3
A401	MODULATOR	6-17

3. WIRES:

MARKING	DESCRIPTION
COLOR NOTE	#24 SOLID COPPER, TEFLON INSULATION
COLOR NOTE PLUS (*)	#24 STRANDED COPPER, TEFLON INSULATION
COLOR NOTE PLUS (22*)	#22 SOLID COPPER, TEFLON INSULATION
COLOR NOTE PLUS (20*)	#20 STRANDED COPPER, TEFLON INSULATION
COLOR NOTE PLUS (18*)	#18 STRANDED COPPER, VINYL INSULATION
UNMARKED	#22 SOLID, BARE, TINNED COPPER, EXCEPT THOSE MARKED WITH SIZE AS SHOWN

4. WIRES MARKED —⊘— ARE #29 SOLID COPPERWELD MINIATURE TEFLON COAXIAL CABLES.

5. FOR 28-VOLT CHASSIS, WIRES MARKED + + + + ARE CONNECTED AND WIRES MARKED . . . . ARE OMITTED.

6. FOR 14-VOLT CHASSIS, WIRES MARKED . . . . ARE CONNECTED AND WIRES MARKED + + + + ARE OMITTED.

7. TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE IS INSTALLED OVER GROUPS OF WIRES MARKED "T."

8. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.

9. FOR COMPLETE WIRING, SEE ALL VIEWS.

10. TEFLON TUBING OF APPROPRIATE SIZE IS INSTALLED AS INDICATED.

11. JUMPER INDICATED IS SOLDERED TO RECEPTACLE SHELL.

12. WIRES OF GROUP INDICATED (—→ ←—) ARE BOUND WITH WAXED NYLON LACING TAPE.

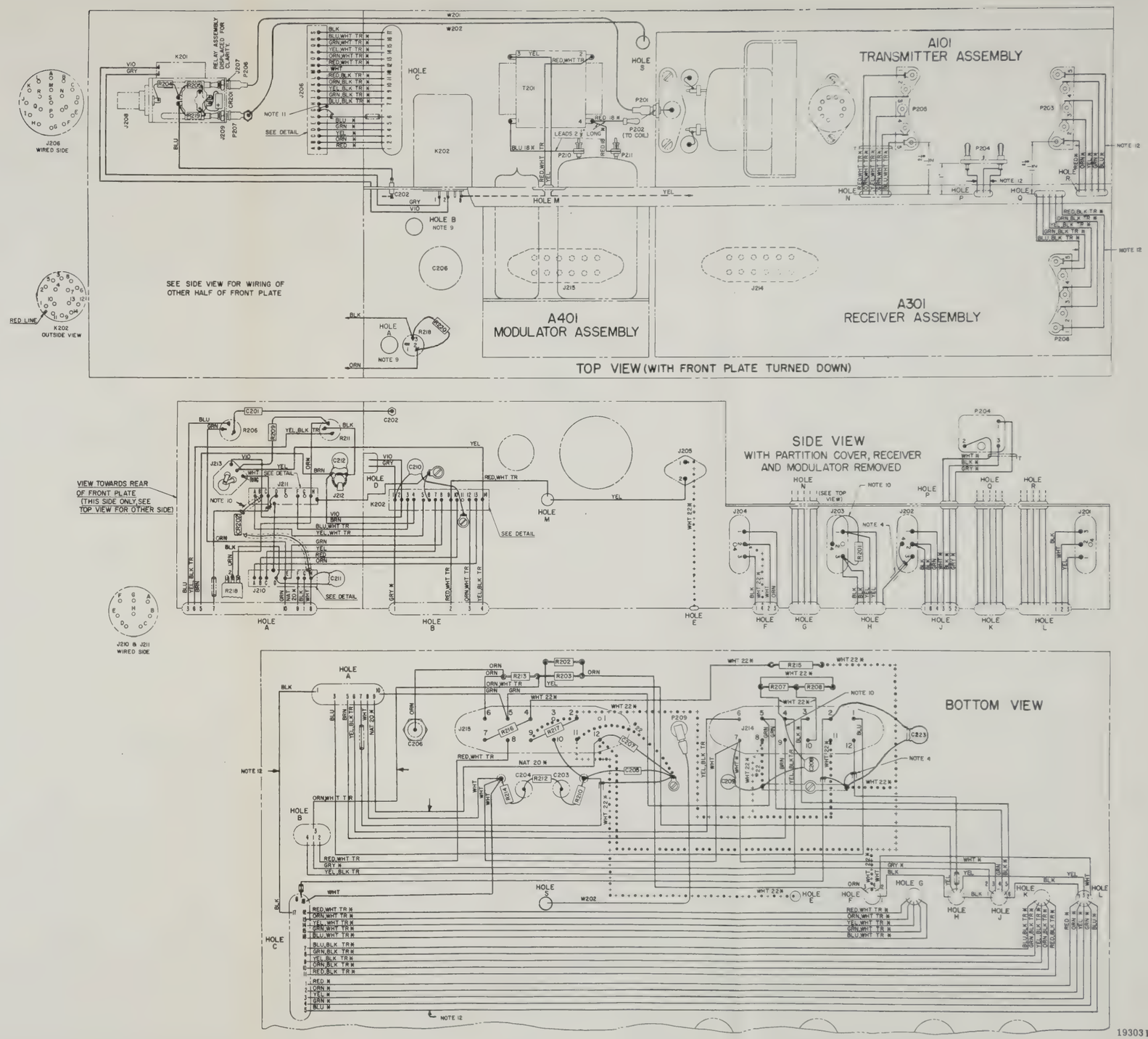
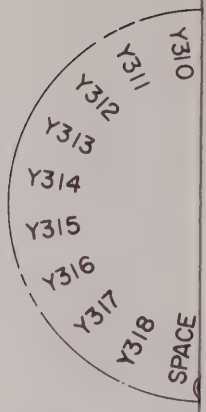

A101
TRANSMITTER ASSEMBLY
A401
MODULATOR ASSEMBLY
A301
RECEIVER ASSEMBLY
TOP VIEW (WITH FRONT PLATE TURNED DOWN)
SIDE VIEW
WITH PARTITION COVER, RECEIVER AND MODULATOR REMOVED
BOTTOM VIEW
SEE SIDE VIEW FOR WIRING OF OTHER HALF OF FRONT PLATE
VIEW TOWARDS REAR OF FRONT PLATE (THIS SIDE ONLY, SEE TOP VIEW FOR OTHER SIDE)
K202 OUTSIDE VIEW
J206 WIRED SIDE
J210 & J211 WIRED SIDE
19303P

Figure 6–2A. ARC Type RT-11A Receiver-Transmitter, Wiring Diagram (M-9 and M-10 Units)



CRYSTAL LOC
(TOP

NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGR

2. ASSOCIATED SUBASSEMBLY WIRING I
FOLLOWS:

SUBASSEMBLY	FIGUR
IF-AF FRAME	6-
LOWER RF FRAME	6-
SECOND MIXER	6-

3. FOR INTERCONNECTIONS WITH OTHE
SEE MAIN CHASSIS WIRING DIAGRAM,

4. WIRES MARKED WITH COLOR NOTE A
TEFLON INSULATED.

5. UNMARKED WIRES ARE #24 BARE, SC

6. FOR COMPLETE WIRING, SEE ALL V

7. WIRES TWISTED TOGETHER ARE IND

8. DARK BAND ON END OF CRYSTAL DI
NEAREST COLOR CODING BAND. SOL
DIODES USING A "HEAT SINK" SUCH
SOLDERING POINT AND CRYSTAL BO

9. IN M-6 AND HIGHER UNITS, CR307 W

10. IN M-9 AND HIGHER UNITS, C379 WA

11. IN LATER M-10 UNITS, CR307 WAS R

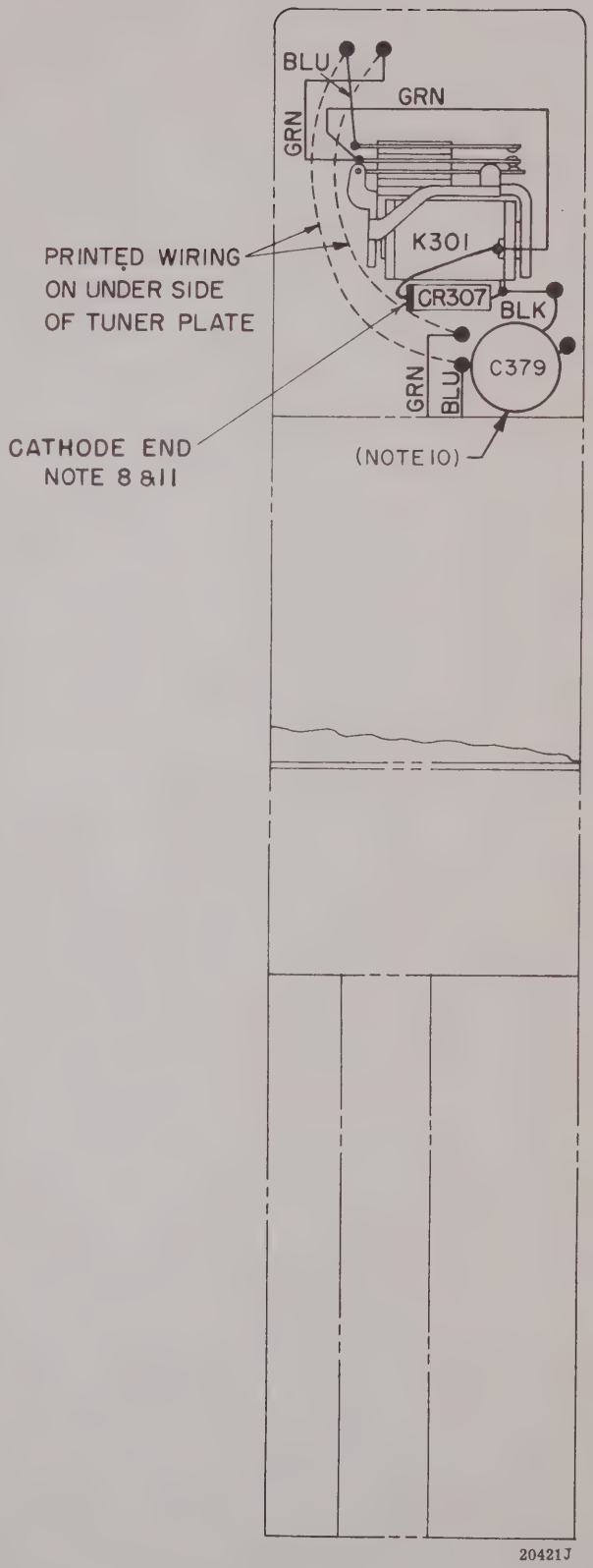


Figure 6–3. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Wiring Diagram

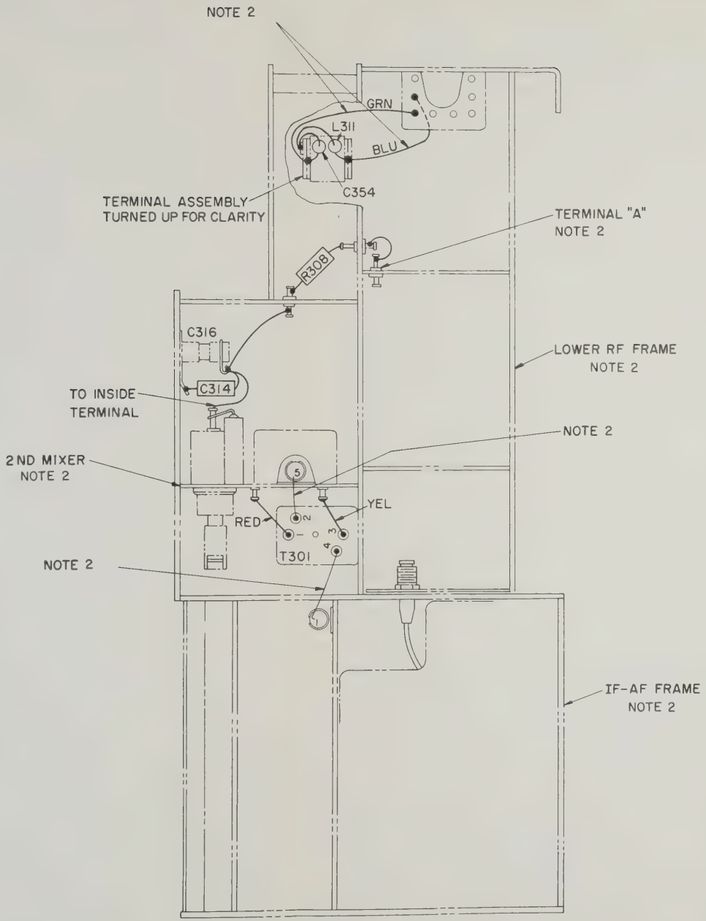
CRYSTAL LOCATION DIAGRAM
(TOP VIEW)

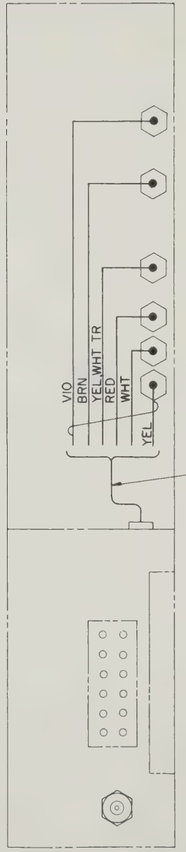
NOTES:

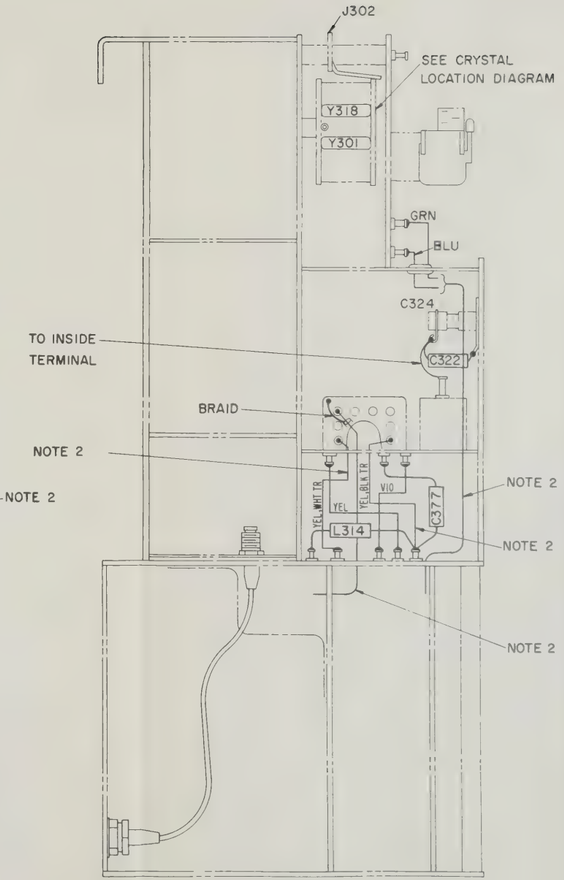
1. FOR ASSOCIATED SCHEMATIC DIAGRAM SEE FIGURE 6-1.
2. ASSOCIATED SUBASSEMBLY WIRING DIAGRAMS ARE AS FOLLOWS:

SUBASSEMBLY	FIGURE NO.
IF-AF FRAME	6-9
LOWER RF FRAME	6-4
SECOND MIXER	6-8

3. FOR INTERCONNECTIONS WITH OTHER MAJOR ASSEMBLIES, SEE MAIN CHASSIS WIRING DIAGRAM, FIGURE 6-2.
4. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
5. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.
6. FOR COMPLETE WIRING, SEE ALL VIEWS.
7. WIRES TWISTED TOGETHER ARE INDICATED .
8. DARK BAND ON END OF CRYSTAL DIODES INDICATES END NEAREST COLOR CODING BAND. SOLDER ALL CRYSTAL DIODES USING A "HEAT SINK" SUCH AS PLIERS BETWEEN SOLDERING POINT AND CRYSTAL BODY.
9. IN M-6 AND HIGHER UNITS, CR307 WAS ADDED.
10. IN M-9 AND HIGHER UNITS, C379 WAS ADDED.
11. IN LATER M-10 UNITS, CR307 WAS REMOVED.







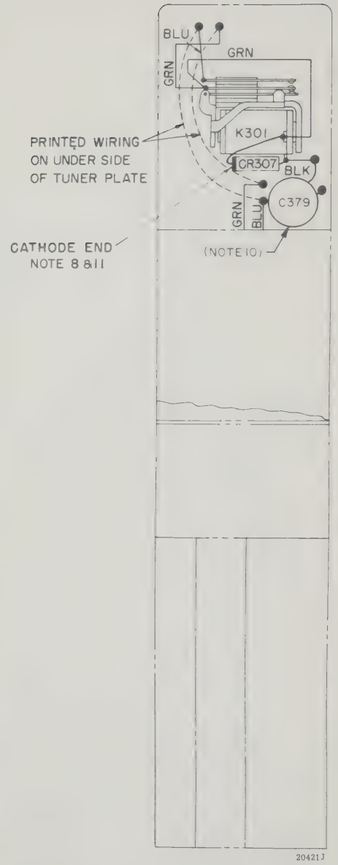


Figure 6-3. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Wiring Diagram

NOTES:

1. FOR
2. ASSO
3. FOR DIAG
4. WIRE INSU
5. UNM
6. WHE THAN
7. FOR COM

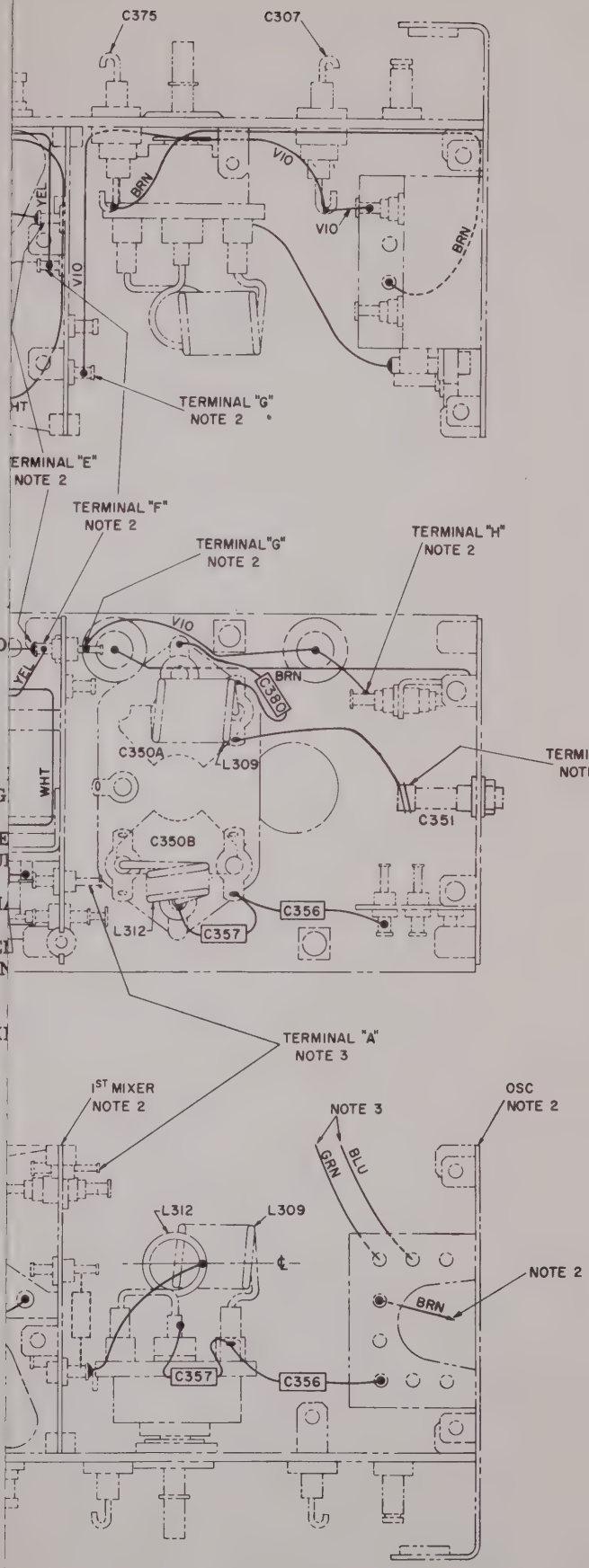


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Figure 6–4. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Lower R-f Frame, Wiring Diagram

NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.

2. ASSOCIATED SUBASSEMBLY WIRING DIAGRAMS ARE AS FOLLOWS:

SUBASSEMBLY	FIGURE NO.
RF CASCODE AMP	6-5
FIRST MIXER	6-6
MC OSC -DOUBLER	6-7

3. FOR INTERCONNECTIONS TO OTHER ASSEMBLIES SEE RECEIVER WIRING DIAGRAM, FIGURE 6-3.

4. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.

5. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.

6. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.

7. FOR COMPLETE WIRING, SEE ALL VIEWS. FOR CLARITY, CERTAIN COMPONENTS AND TERMINALS ARE OMITTED IN ONE OR MORE VIEWS.

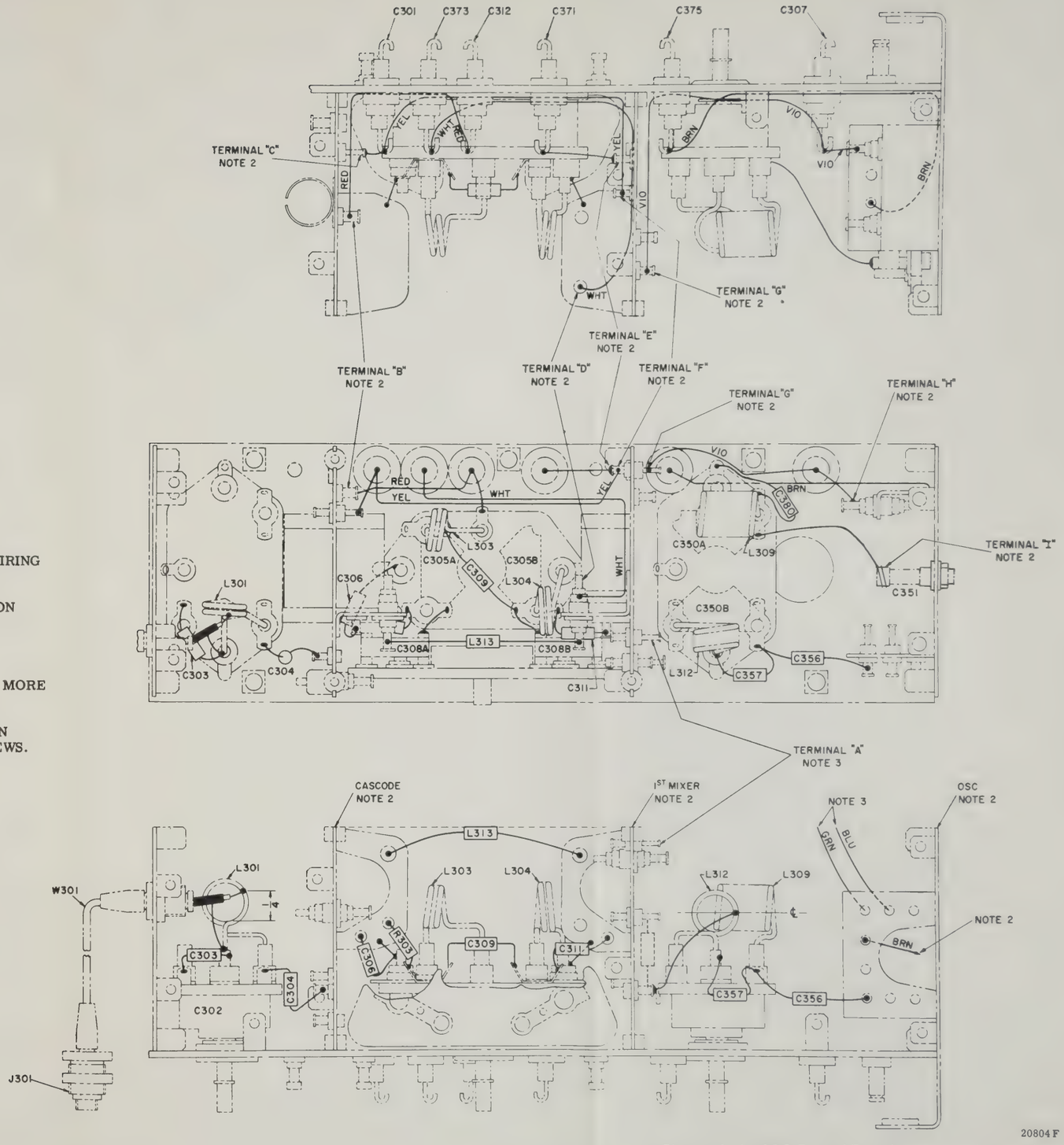

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Figure 6–4. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Lower R-f Frame, Wiring Diagram

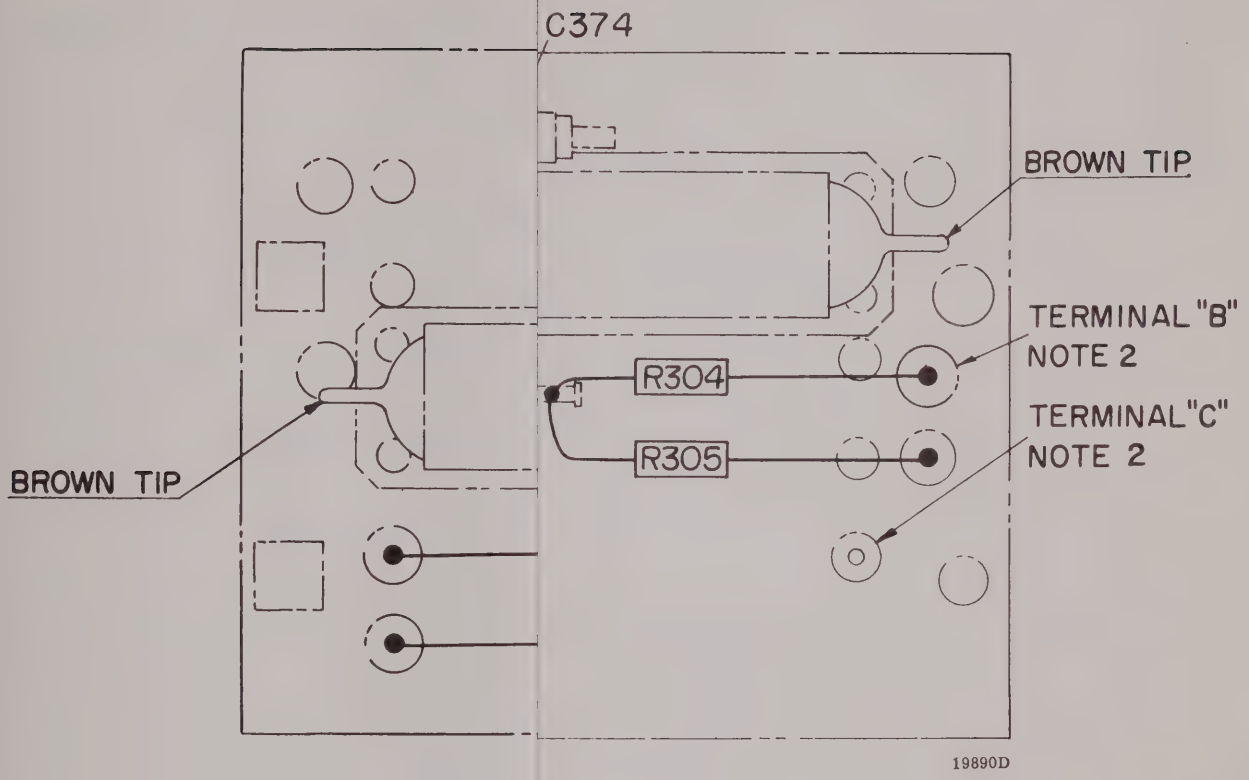
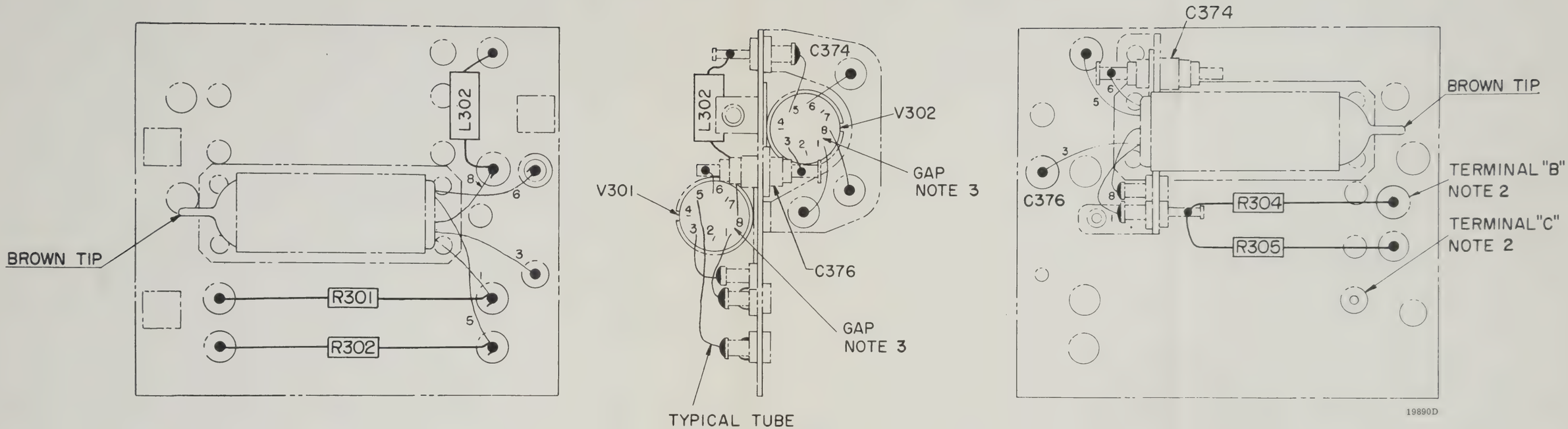


Figure 6–5. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, R-f Cascode Amplifier, Wiring Diagram



NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE ASSOCIATED WIRING DIAGRAM, FIGURE 6-4.
3. ELECTRON TUBES V301 AND V302 ARE VIEWED TOWARD BASE ON CENTER VIEW. ORIENT TUBES IN CLIP AS SHOWN.
4. BARE TUBE LEADS ARE DRESSED WITH 1/16'' MINIMUM CLEARANCE. UNUSED LEADS NO. 2, 4, AND 7 ARE CUT OFF APPROXIMATELY 1/32'' FROM GLASS.
5. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.

Figure 6–5. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, R-f Cascode Amplifier, Wiring Diagram

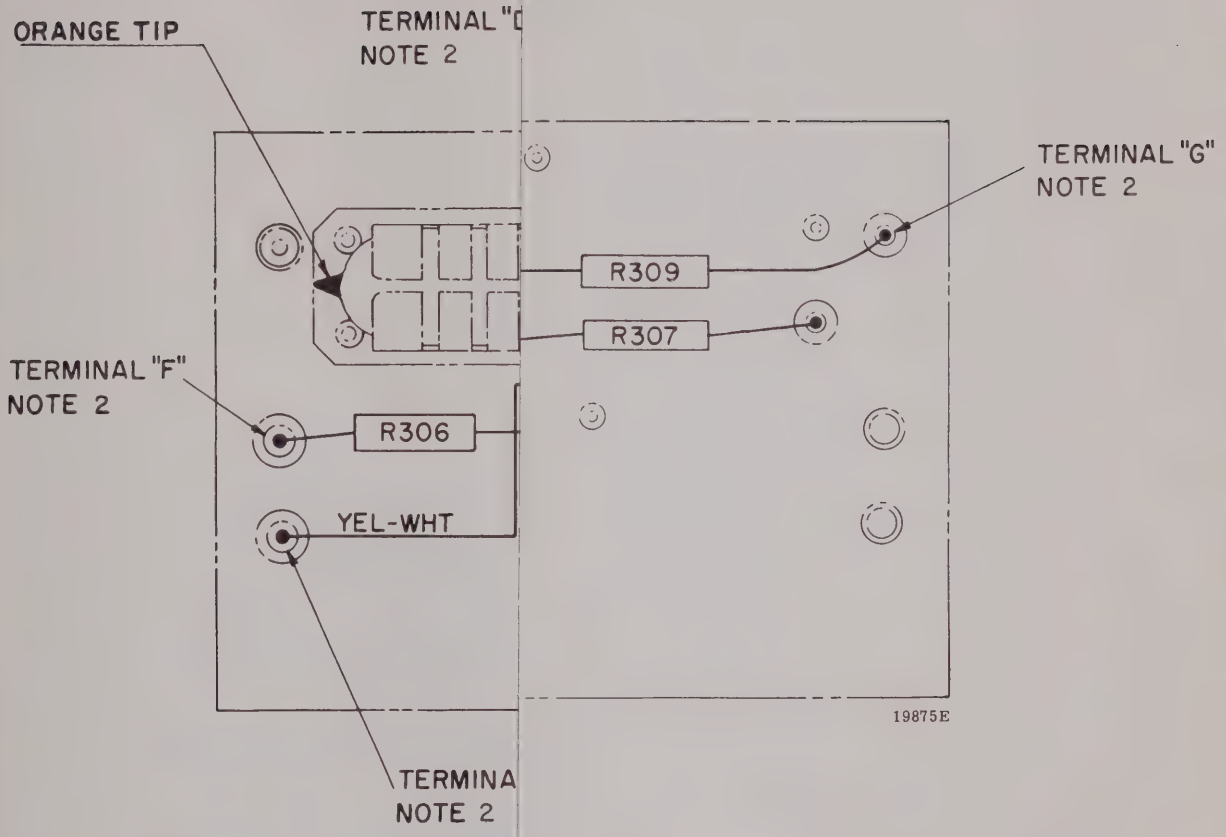
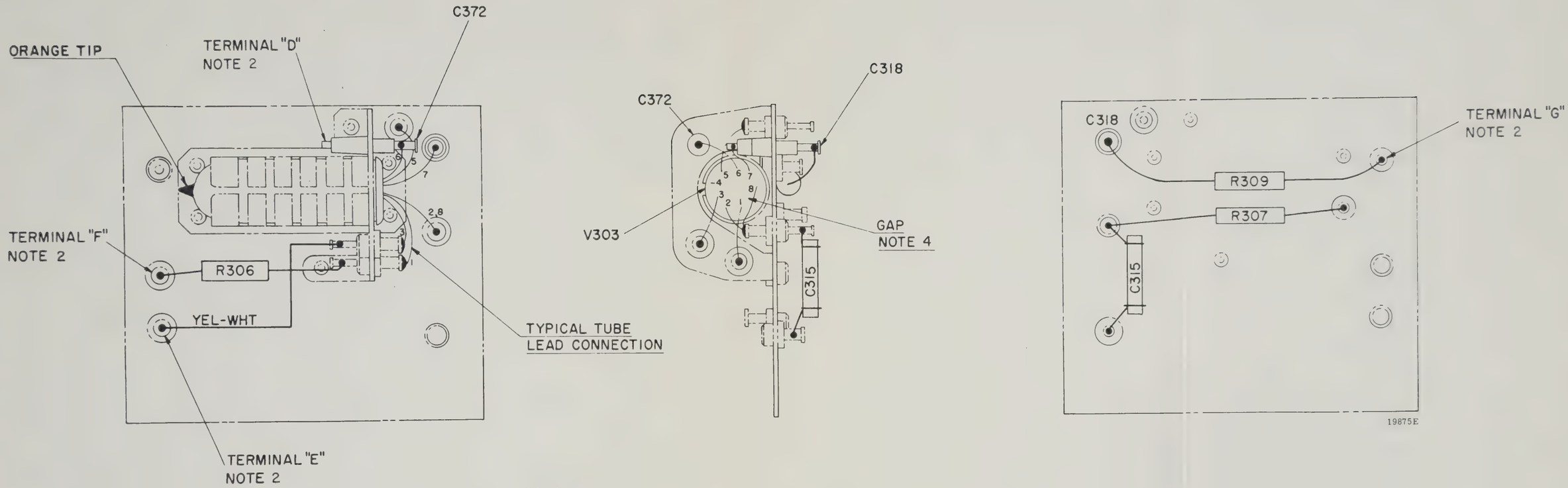


Figure 6–6. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, First Mixer, Wiring Diagram

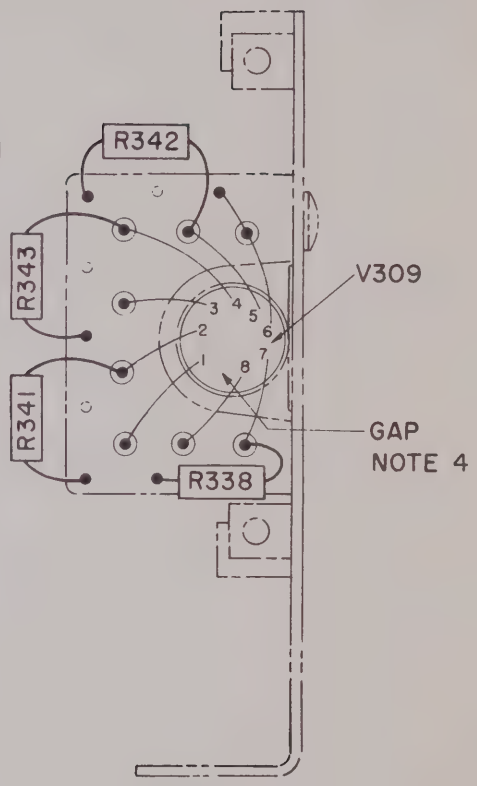


NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE ASSOCIATED WIRING DIAGRAM, FIGURE 6-4.
3. WIRE MARKED WITH COLOR NOTE IS #24 SOLID COPPER, TEFLON INSULATED.
4. ELECTRON TUBE V303 IS VIEWED TOWARD BASE ON CENTER VIEW. ORIENT TUBE IN CLIP AS SHOWN.
5. BARE TUBE LEADS ARE DRESSED WITH 1/16'' MINIMUM CLEARANCE. UNUSED LEAD NO. 4 IS CUT OFF APPROXIMATELY 1/32'' AWAY FROM GLASS.
6. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.

Figure 6–6. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, First Mixer, Wiring Diagram

YPICAL TUBE
EAD CONNECTION



NOTES:

1. FOR ASSOCIATED SCHEMATIC
SEE FIGURE 6-1.

2. FOR INTERCONNECTIONS WITH
ASSEMBLIES, SEE ASSOCIATED
DIAGRAMS, FIGURES 6-3 AND

3. WIRES MARKED WITH COLOR
#24 SOLID COPPER, TEFLON I

4. ELECTRON TUBE V309 IS VIEW
BASE, ON RIGHT VIEW. ORIEN
CLIP AS SHOWN.

5. BARE TUBE LEADS ARE DRESS
1/16" MINIMUM CLEARANCE.

6. FOR COMPLETE WIRING, SEE

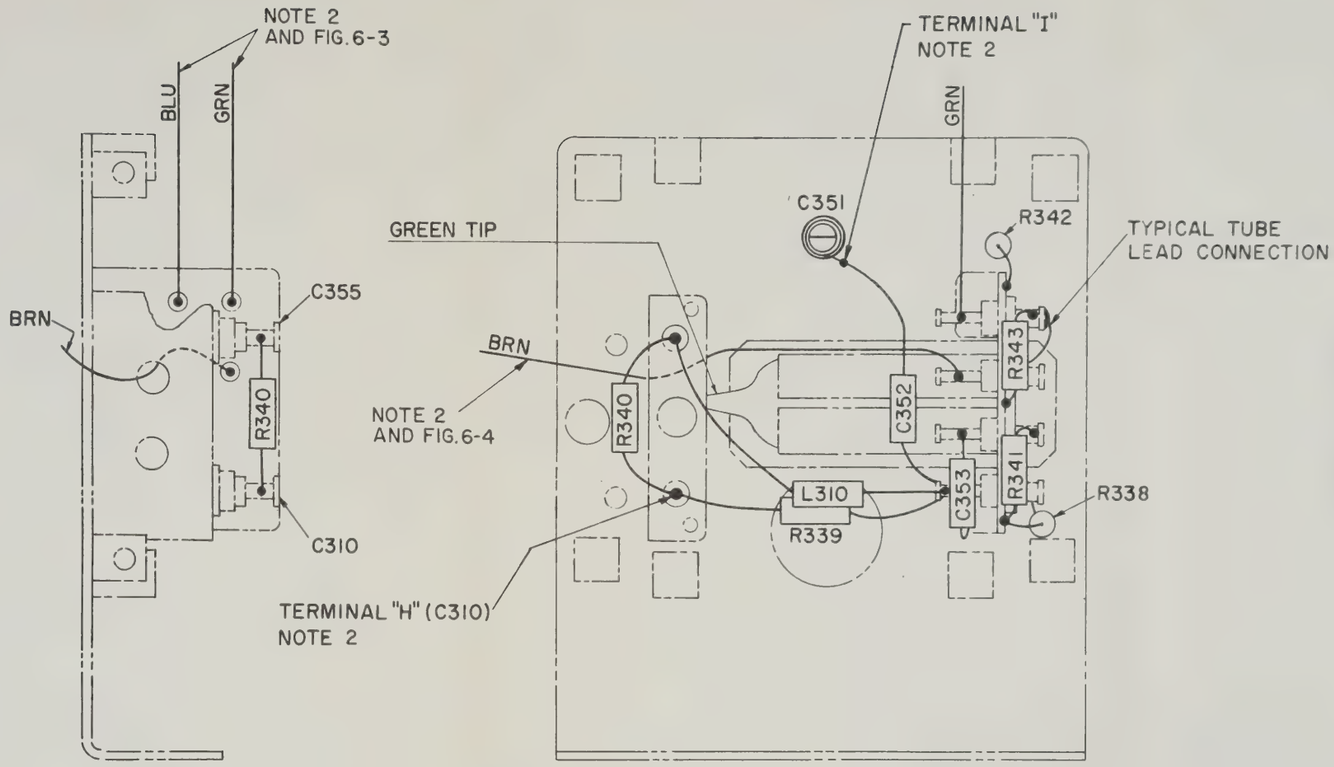
7. WHEN REQUIRED FOR CLARIT
NENTS ARE IDENTIFIED IN MO
ONE VIEW.

19885H

Figure 6–7. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Megacycle Crystal Oscillator-Doubler, Wiring Diagram

NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE ASSOCIATED WIRING DIAGRAMS, FIGURES 6-3 AND 6-4.
3. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
4. ELECTRON TUBE V309 IS VIEWED TOWARD BASE, ON RIGHT VIEW. ORIENT TUBE IN CLIP AS SHOWN.
5. BARE TUBE LEADS ARE DRESSED WITH 1/16" MINIMUM CLEARANCE.
6. FOR COMPLETE WIRING, SEE ALL VIEWS.
7. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.



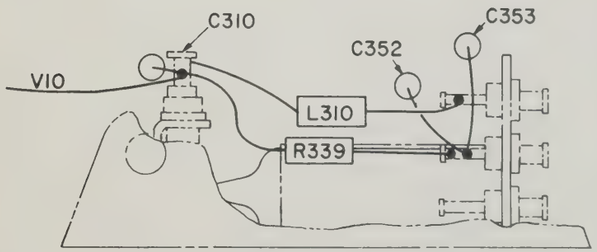


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Figure 6–7. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Megacycle Crystal Oscillator-Doubler, Wiring Diagram

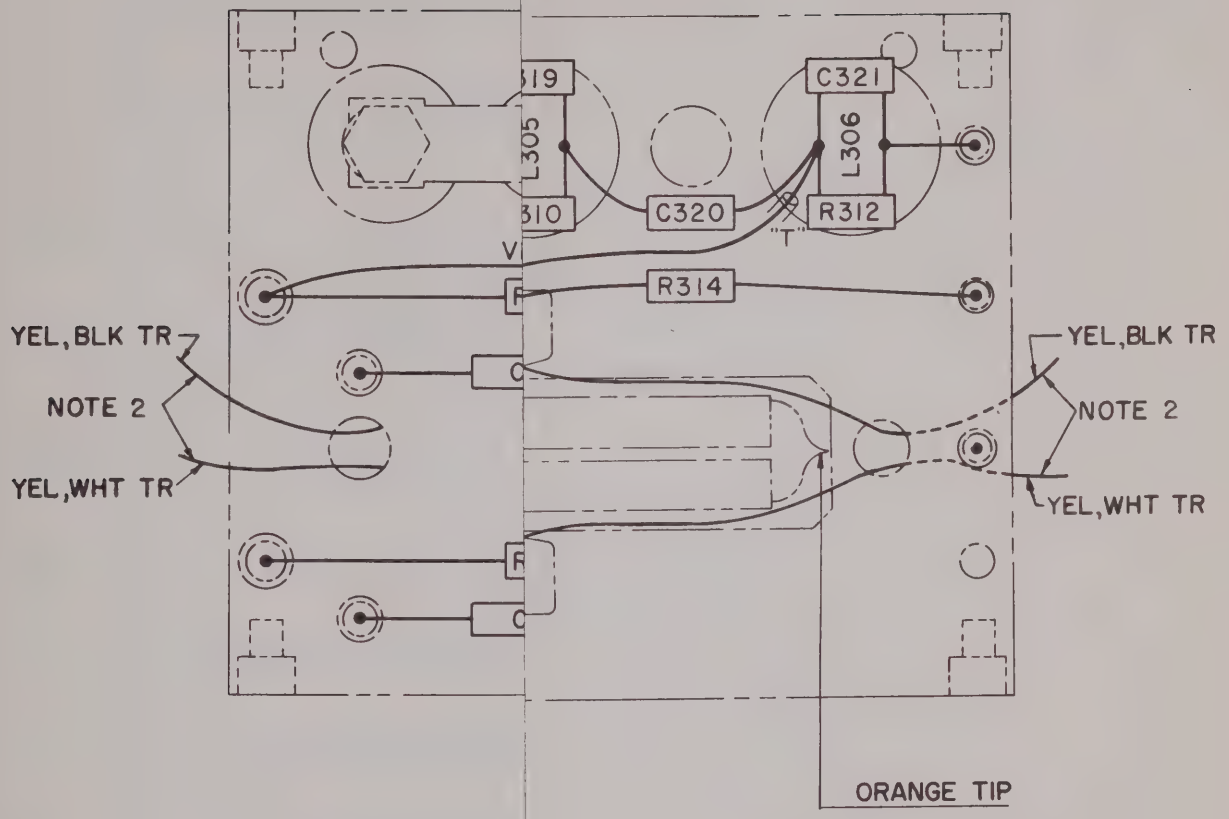

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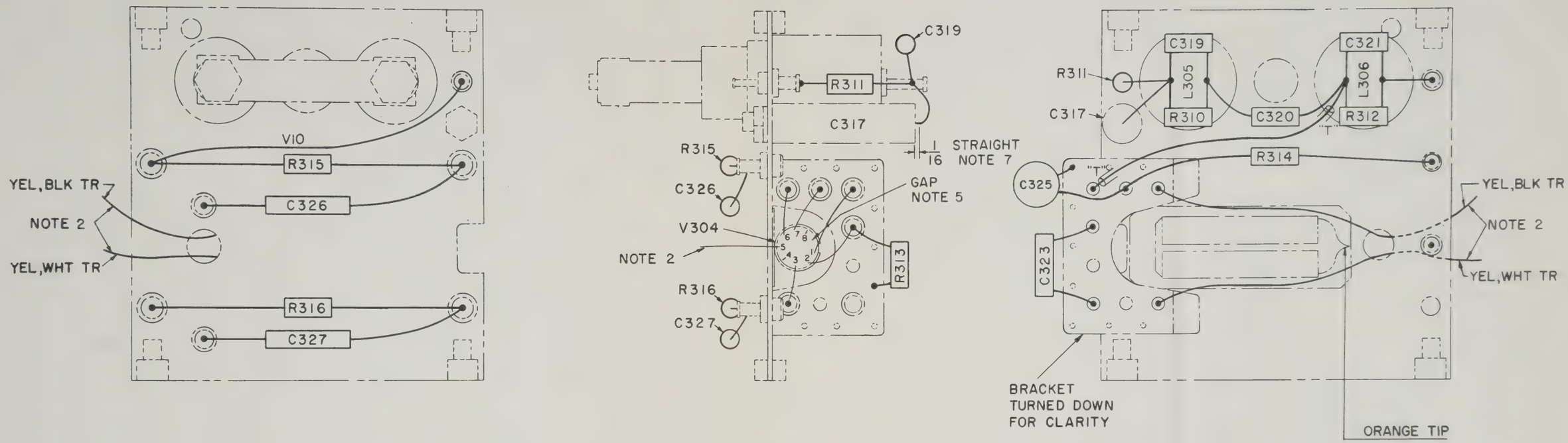
Figure 6–8. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Second Mixer, Wiring Diagram



NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE ASSOCIATED WIRING DIAGRAM, FIGURE 6-3.
3. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
4. TEFLON TUBING OF APPROPRIATE SIZE IS INSTALLED OVER WIRES MARKED "T."
5. ELECTRON TUBE V304 IS VIEWED TOWARD BASE IN END VIEW. ORIENT TUBE IN CLIP AS SHOWN.
6. BARE TUBE LEADS ARE DRESSED WITH 1/16" MINIMUM CLEARANCE. UNUSED LEADS NO. 4 & 8 ARE CUT OFF APPROXIMATELY 1/32" FROM GLASS.
7. LEADS FROM C317 ARE DRESSED AS SHOWN AND ARE AS SHORT AS POSSIBLE.
8. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.

197201

Figure 6–8. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, Second Mixer, Wiring Diagram

NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGR SEE FIGURE 6-1.

2. ASSOCIATED SUBASSEMBLY WIRING DIAGRAMS ARE AS FOLLOWS:

SUBASSEMBLY	FIGURE NO
RESISTOR PANEL ASSY	6-11
IF-AF PANEL ASSY	6-10

3. FOR INTERCONNECTIONS WITH OTH ASSEMBLIES, SEE WIRING DIAGRAM FIGURE 6-3.

4. WIRES MARKED WITH COLOR NOTE #24 SOLID COPPER, TEFLON INSULA

5. UNMARKED WIRES ARE #24 BARE, S TINNED COPPER.

6. WIRE MARKED ⇉ IS #29 SOLID COP WELD MINIATURE TEFLON COAXIAL

7. BARE TUBE LEADS ARE DRESSED W 1/16" MINIMUM CLEARANCE. UNUS LEADS ARE CUT OFF APPROXIMATE 1/32" FROM GLASS.

8. FOR COMPLETE WIRING, SEE ALL V

9. ELECTRON TUBES ARE VIEWED TOV BASE ON FRONT VIEW. ORIENT TUI CLIP AS SHOWN.

10. WIRES TWISTED TOGETHER ARE IND TED ≋.

11. TEFLON TUBING OF APPROPRIATE IS INSTALLED OVER GROUPS OF WIF MARKED "T."

12. TEFLON TUBING OF APPROPRIATE IS INSTALLED OVER ALL LEADS OF V306, AND V307.

13. TRANSPARENT VINYLITE TUBING (. 2-1/16" LONG, IS INSTALLED OVER CAPACITOR SHELL TO INSULATE SH FROM MOUNTING CLIPS.

14. TRANSPARENT VINYLITE TUBING (. 1" LONG, IS INSTALLED OVER CAPA SHELL TO INSULATE SHELL FROM ADJACENT COMPONENTS.

15. TRANSPARENT VINYLITE TUBING OI APPROPRIATE DIAMETER AND APP MATELY 1/2" LONG, IS INSTALLED COAXIAL CABLE TERMINATION TO I VENT TRIMMED BRAID ENDS FROM TOUCHING CHASSIS.

16. LEADS FROM TUBE V310 ARE 1/8" MINIMUM BELOW EDGE OF FRAME ASSEMBLY.

17. IN M-1 THROUGH M-7 UNITS, C345 CONNECTED BETWEEN TERMINAL AND GROUND, AND TERMINAL 4 OF CONNECTED TO PIN 1 OF V308.

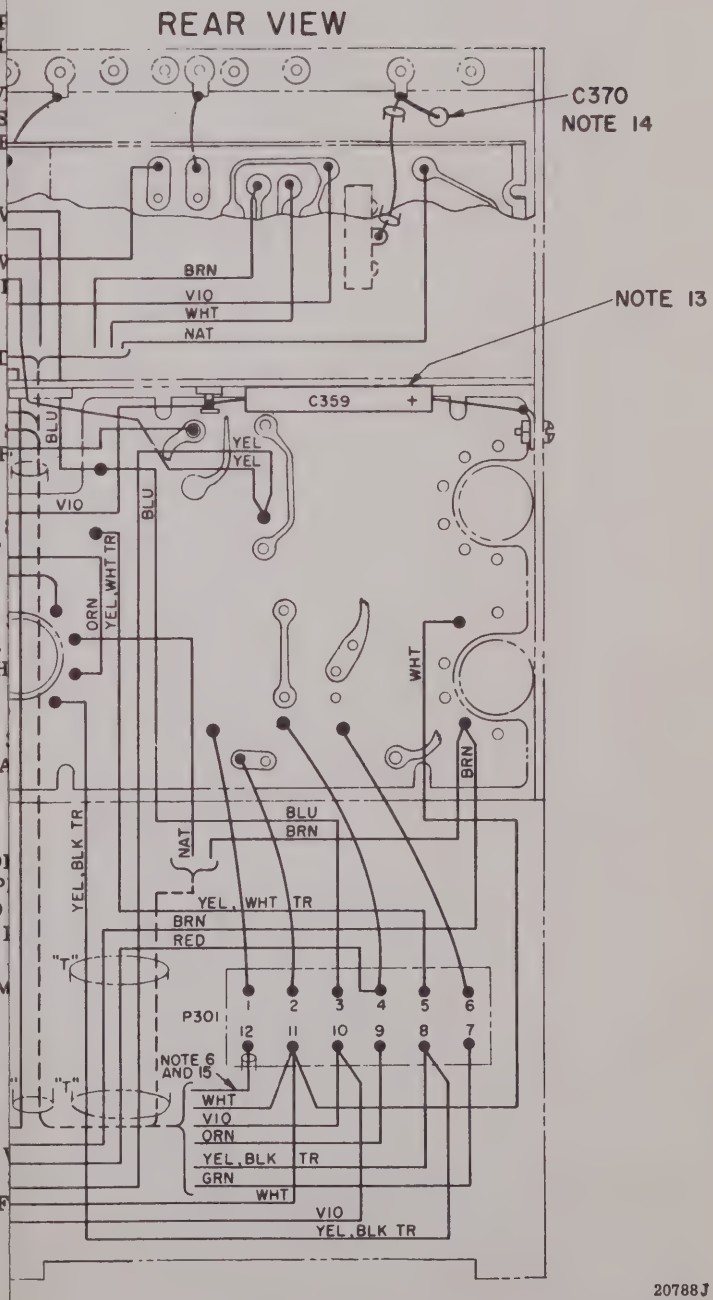


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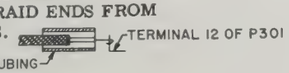
Figure 6–9. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, Wiring Diagram

NOTES:

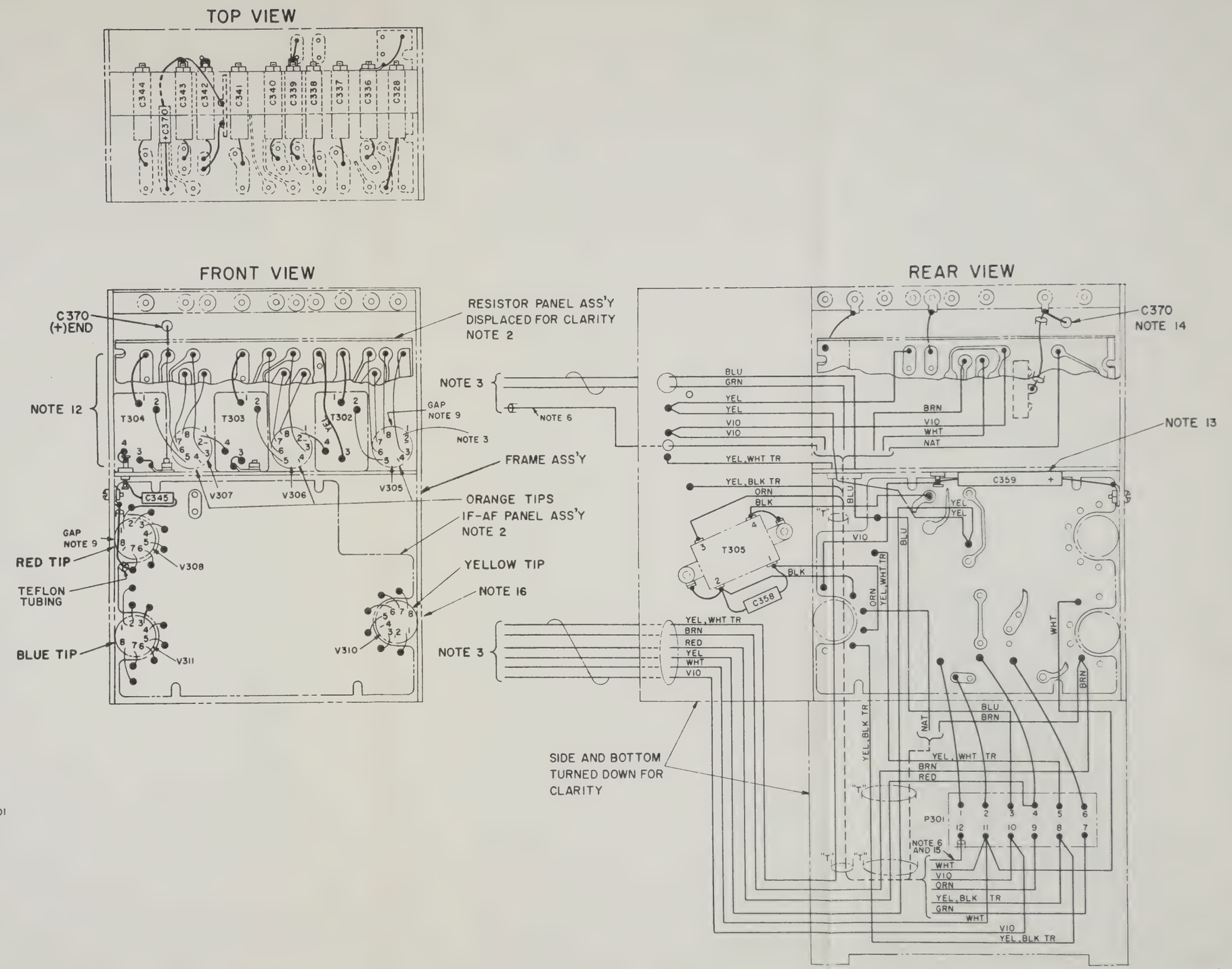
1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. ASSOCIATED SUBASSEMBLY WIRING DIAGRAMS ARE AS FOLLOWS:

SUBASSEMBLY	FIGURE NO.
RESISTOR PANEL ASSY	6-11
IF-AF PANEL ASSY	6-10

3. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE WIRING DIAGRAM, FIGURE 6-3.
4. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
5. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.
6. WIRE MARKED ⊣⊢ IS #29 SOLID COPPER-WELD MINIATURE TEFLON COAXIAL CABLE.
7. BARE TUBE LEADS ARE DRESSED WITH 1/16" MINIMUM CLEARANCE. UNUSED LEADS ARE CUT OFF APPROXIMATELY 1/32" FROM GLASS.
8. FOR COMPLETE WIRING, SEE ALL VIEWS.
9. ELECTRON TUBES ARE VIEWED TOWARD BASE ON FRONT VIEW. ORIENT TUBES IN CLIP AS SHOWN.
10. WIRES TWISTED TOGETHER ARE INDICATED ∿∿.
11. TEFLON TUBING OF APPROPRIATE SIZE IS INSTALLED OVER GROUPS OF WIRES MARKED "T."
12. TEFLON TUBING OF APPROPRIATE SIZE IS INSTALLED OVER ALL LEADS OF V305, V306, AND V307.
13. TRANSPARENT VINYLITE TUBING (.375" I.D.), 2-1/16" LONG, IS INSTALLED OVER CAPACITOR SHELL TO INSULATE SHELL FROM MOUNTING CLIPS.
14. TRANSPARENT VINYLITE TUBING (.313" I.D.), 1" LONG, IS INSTALLED OVER CAPACITOR SHELL TO INSULATE SHELL FROM ADJACENT COMPONENTS.
15. TRANSPARENT VINYLITE TUBING OF APPROPRIATE DIAMETER AND APPROXIMATELY 1/2" LONG, IS INSTALLED OVER COAXIAL CABLE TERMINATION TO PREVENT TRIMMED BRAID ENDS FROM TOUCHING CHASSIS.



16. LEADS FROM TUBE V310 ARE 1/8" MINIMUM BELOW EDGE OF FRAME ASSEMBLY.
17. IN M-1 THROUGH M-7 UNITS, C345 WAS CONNECTED BETWEEN TERMINAL 3 OF T304 AND GROUND, AND TERMINAL 4 OF T304 WAS CONNECTED TO PIN 1 OF V308.



20788J

Figure 6–9. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, Wiring Diagram

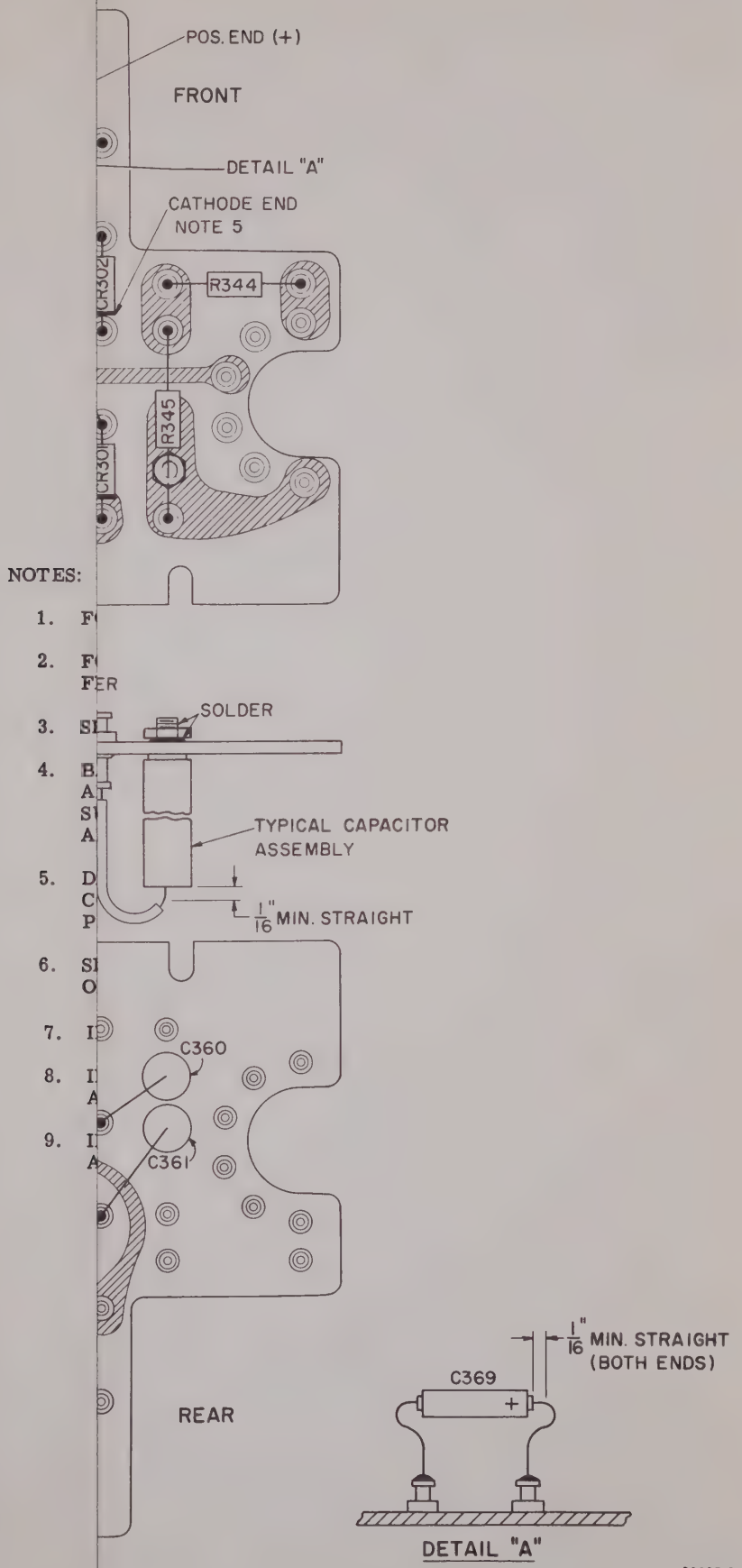
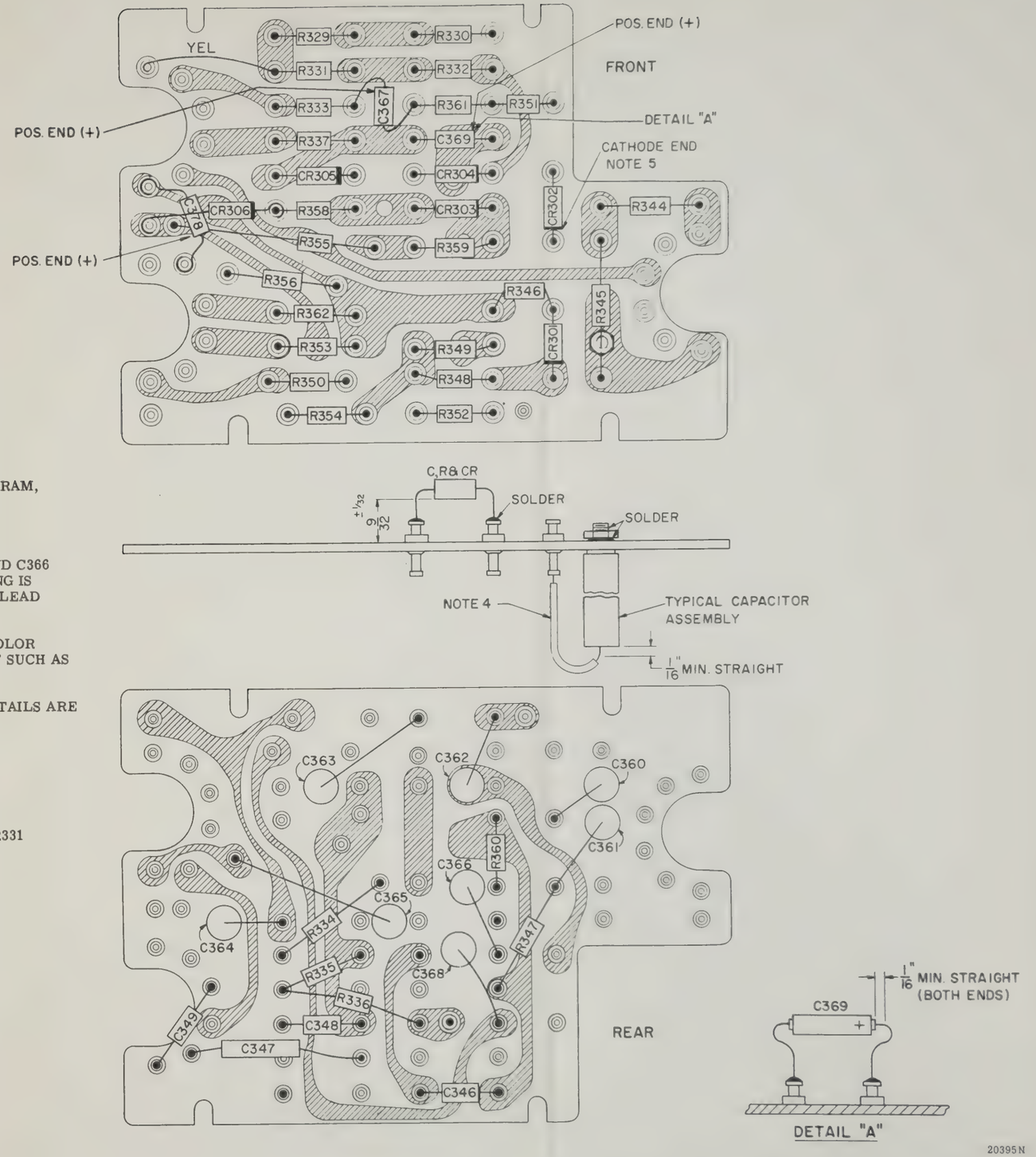


Figure 6–10. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, A-f Printed-circuit Assembly, Wiring Diagram

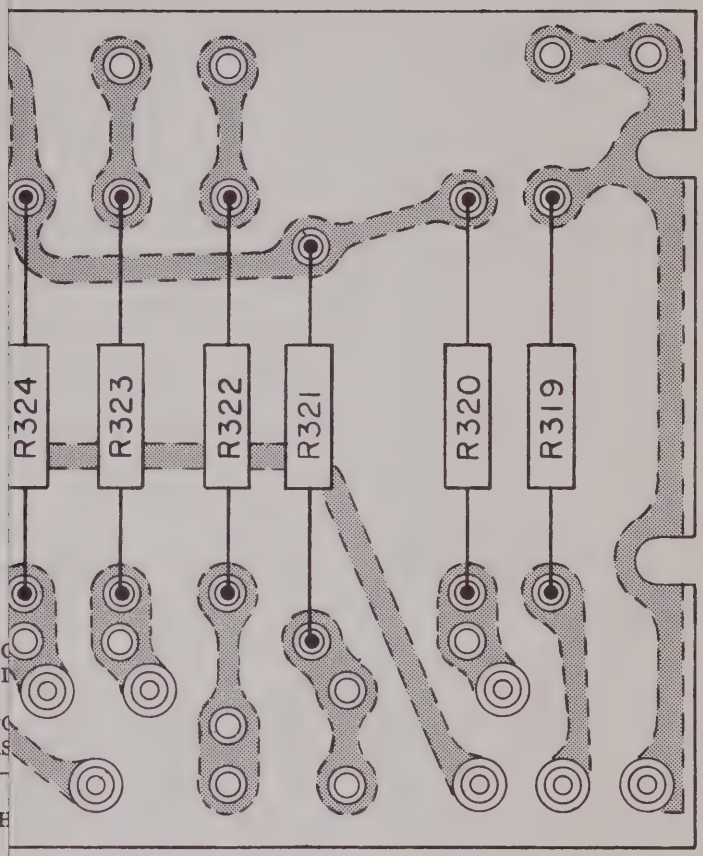
NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE WIRING DIAGRAM, FIGURE 6-9.
3. SHADED AREA DENOTES UNETCHED COPPER.
4. BARE LEADS OF CAPACITORS C360, C361, C362, C363, C364, C365, AND C366 ARE COVERED WITH TEFLON TUBING (.036" I.D.). LENGTH OF TUBING IS SUFFICIENT TO PROVIDE INSULATION AT ALL TIMES BETWEEN WIRE LEAD AND TOP RIM OF CAPACITOR.
5. DARK BAND ON END OF CRYSTAL DIODES INDICATES END NEAREST COLOR CODING BAND. SOLDER ALL CRYSTALS DIODES USING A "HEAT SINK" SUCH AS PLIERS BETWEEN SOLDERING POINT AND CRYSTAL BODY.
6. SIDE ELEVATION SHOWS TYPICAL COMPONENT MOUNTING. MOST DETAILS ARE OMITTED FROM THIS VIEW.
7. IN M-6 AND HIGHER UNITS, CR306 WAS ADDED.
8. IN M-1 THROUGH M-6 UNITS, C367 WAS LOCATED ON REAR OF ASSEMBLY (SEE FIGURE 5-22).
9. IN M-1 THROUGH M-7 UNITS, YELLOW WIRE CONNECTED BETWEEN R331 AND TERMINAL STUD WAS NOT USED.



20395N

Figure 6–10. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, A-f Printed-circuit Assembly, Wiring Diagram



NOTES:

1. F
FI

2. F
A
6-

3. SH

19979K

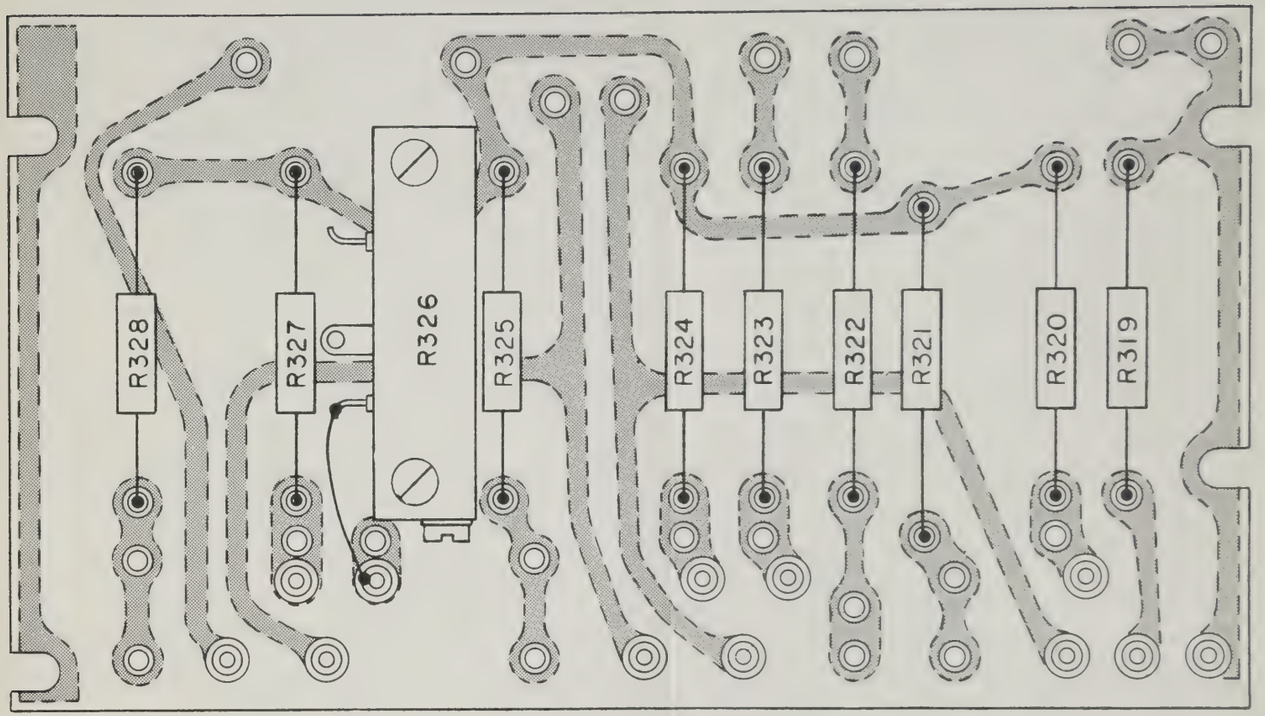
Figure 6–11. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, I-f Resistor Printed-circuit Assembly, Wiring Diagram

NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.

2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE WIRING DIAGRAM, FIGURE 6-9.

3. SHADED AREA DENOTES UNETCHED COPPER.



19979K

Figure 6–11. ARC Type RT-11A Receiver-Transmitter, Receiver Assembly, I-f and A-f Frame, I-f Resistor Printed-circuit Assembly, Wiring Diagram

NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.

2. FOR INTERCONNECTIONS WITH OTHER MAJOR SEMBLIES, SEE MAIN CHASSIS WIRING DIAGRA FIGURE 6-2.

3. ASSOCIATED SUBASSEMBLY WIRING DIAGRAMS ARE AS FOLLOWS:

SUBASSEMBLY	FIGURE NO
RF AMPLIFIER	6-16
FRACT MC OSC -DOUBLER	6-15
MC OSC -DOUBLER	6-13
TUNER ASSEMBLY	6-14

4. WIRES MARKED WITH COLOR NOTE ARE #24 SO COPPER, TEFLON INSULATED.

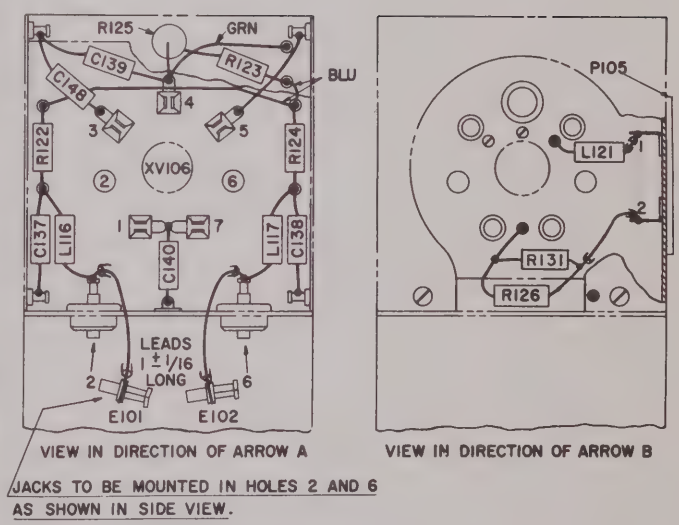
5. UNMARKED WIRES ARE #24 BARE, SOLID, TIN COPPER, EXCEPT THOSE MARKED WITH SIZE SHOWN.

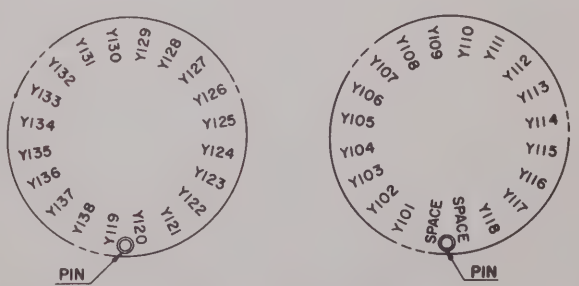
6. FOR COMPLETE WIRING, SEE ALL VIEWS. FO CLARITY, CERTAIN COMPONENTS AND TERMI ARE OMITTED IN ONE OR MORE VIEWS.

7. WHEN REQUIRED FOR CLARITY, COMPONENTS IDENTIFIED IN MORE THAN ONE VIEW.

8. TRANSPARENT VINYLITE TUBING OF APPROPI SIZE IS INSTALLED OVER WIRES INDICATED

9. P106 AND P107 LEADS ARE #20 FLEXIBLE WIR UNINSULATED.





19371L

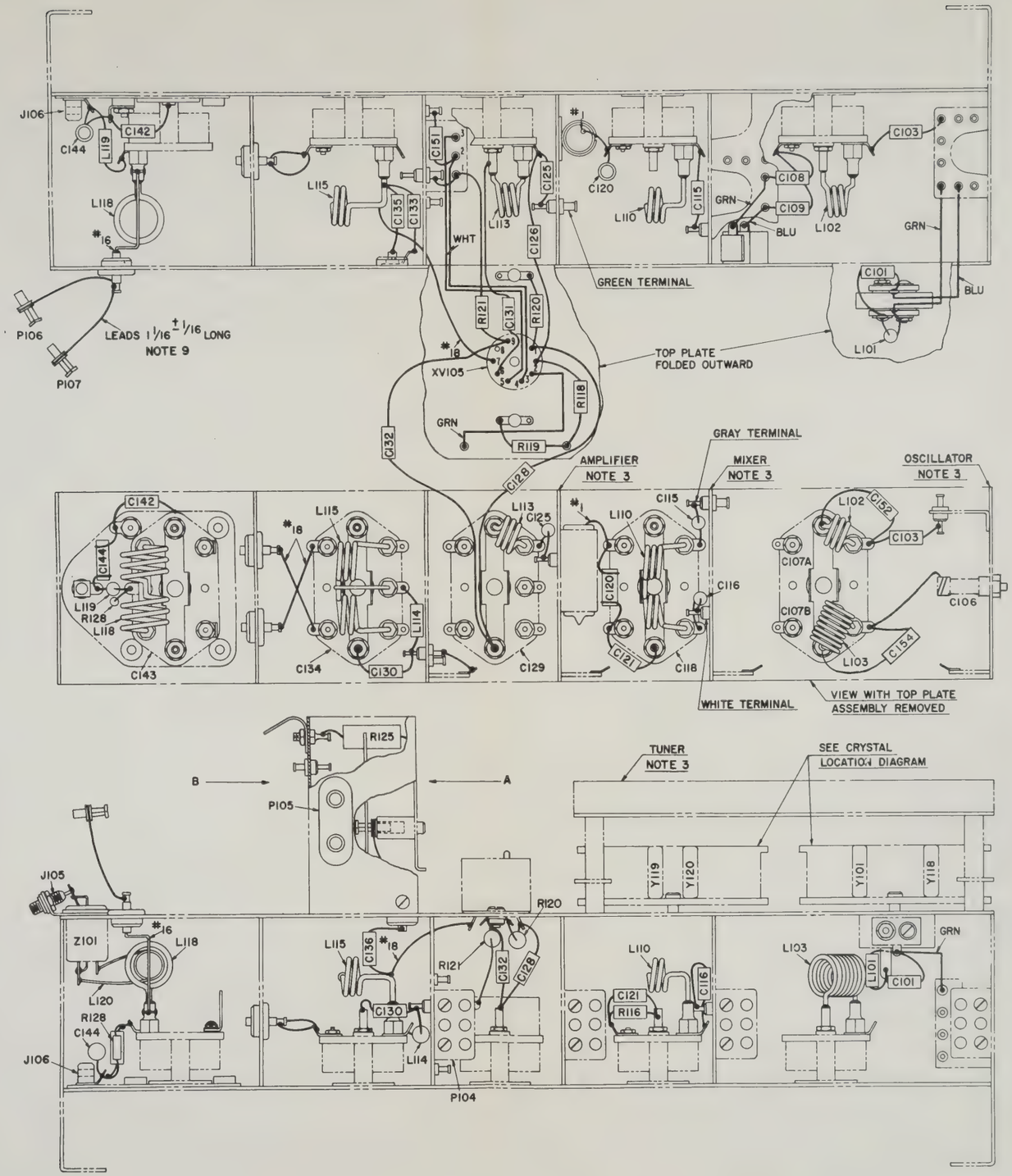
Figure 6–12. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Wiring Diagram

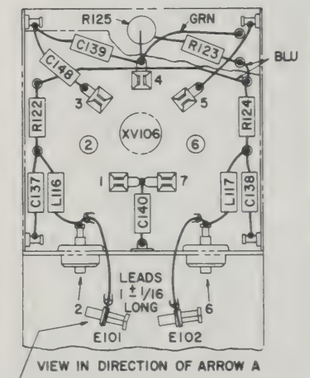
NOTES:

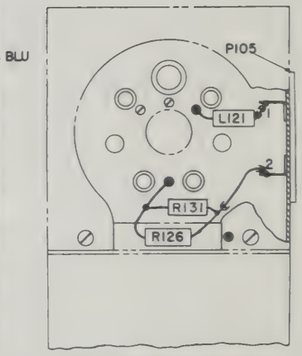
1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER MAJOR ASSEMBLIES, SEE MAIN CHASSIS WIRING DIAGRAM, FIGURE 6-2.
3. ASSOCIATED SUBASSEMBLY WIRING DIAGRAMS ARE AS FOLLOWS:

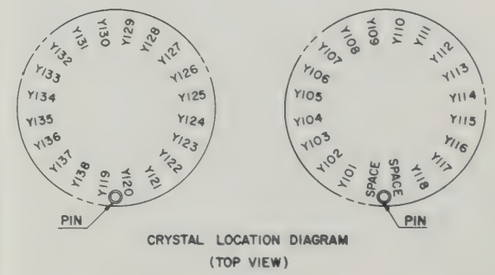
SUBASSEMBLY	FIGURE NO.
RF AMPLIFIER	6-16
FRACT MC OSC -DOUBLER	6-15
MC OSC -DOUBLER	6-13
TUNER ASSEMBLY	6-14

4. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
5. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER, EXCEPT THOSE MARKED WITH SIZE AS SHOWN.
6. FOR COMPLETE WIRING, SEE ALL VIEWS. FOR CLARITY, CERTAIN COMPONENTS AND TERMINALS ARE OMITTED IN ONE OR MORE VIEWS.
7. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.
8. TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE IS INSTALLED OVER WIRES INDICATED —⊐—
9. P106 AND P107 LEADS ARE #20 FLEXIBLE WIRE, UNINSULATED.







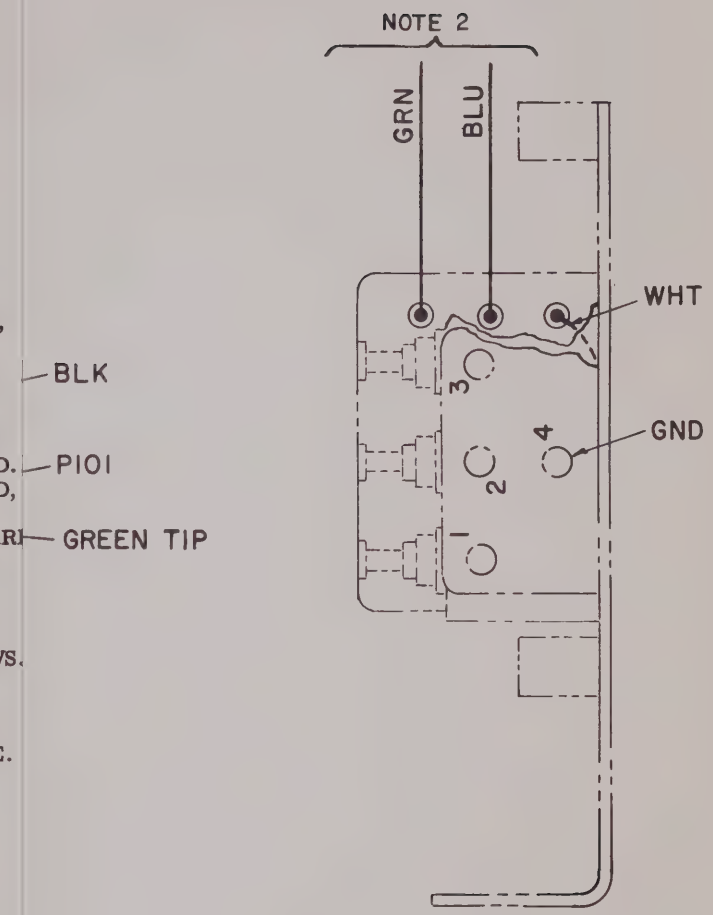


19371L

Figure 6–12. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Wiring Diagram

NOTES:

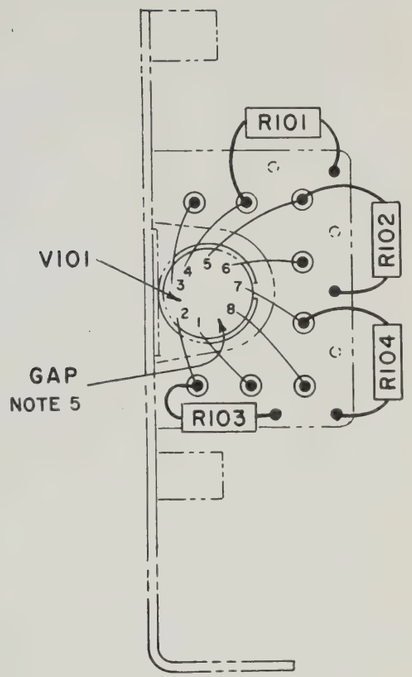
1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE ASSOCIATED WIRING DIAGRAM, FIGURE 6-12.
3. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
4. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.
5. ELECTRON TUBE V101 IS VIEWED TOWARD BASE ON LEFT VIEW. ORIENT TUBE IN CLIP AS SHOWN.
6. BARE TUBE LEADS ARE DRESSED WITH 1/16" MINIMUM CLEARANCE.
7. FOR COMPLETE WIRING, SEE ALL VIEWS.
8. DUPLICATE SYMBOL NUMBERS ARE SHOWN FOR CLARITY.
9. WIRE MARKED "T" IS COVERED WITH TEFLON TUBING OF APPROPRIATE SIZE.

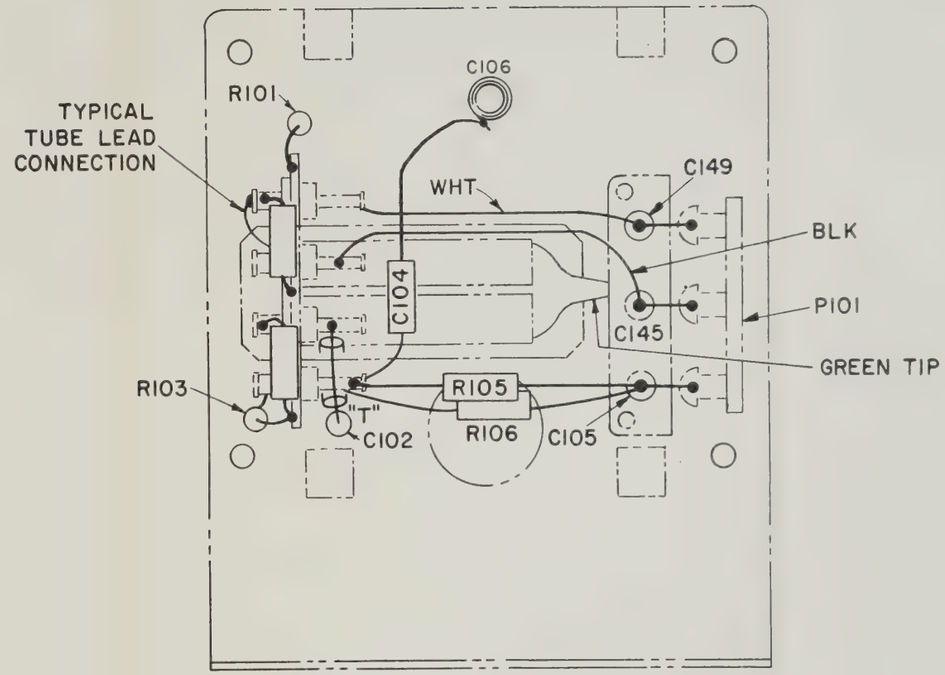


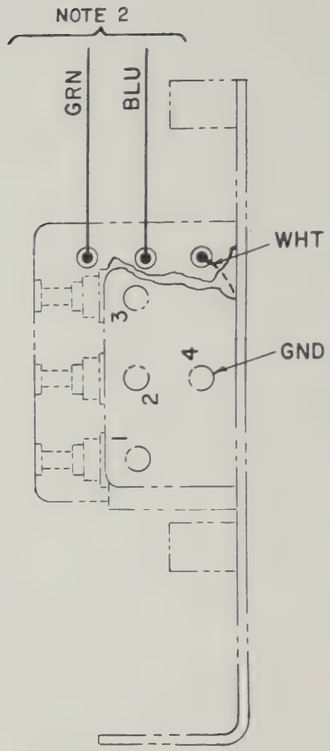
20766 G

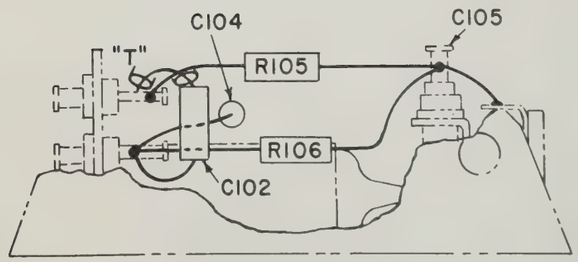
Figure 6–13. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Megacycle Crystal Oscillator-Doubler, Wiring Diagram

NOTES:
1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE ASSOCIATED WIRING DIAGRAM, FIGURE 6-12.
3. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
4. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.
5. ELECTRON TUBE V101 IS VIEWED TOWARD BASE ON LEFT VIEW. ORIENT TUBE IN CLIP AS SHOWN.
6. BARE TUBE LEADS ARE DRESSED WITH 1/16" MINIMUM CLEARANCE.
7. FOR COMPLETE WIRING, SEE ALL VIEWS.
8. DUPLICATE SYMBOL NUMBERS ARE SHOWN FOR CLARITY.
9. WIRE MARKED "T" IS COVERED WITH TEFLON TUBING OF APPROPRIATE SIZE.



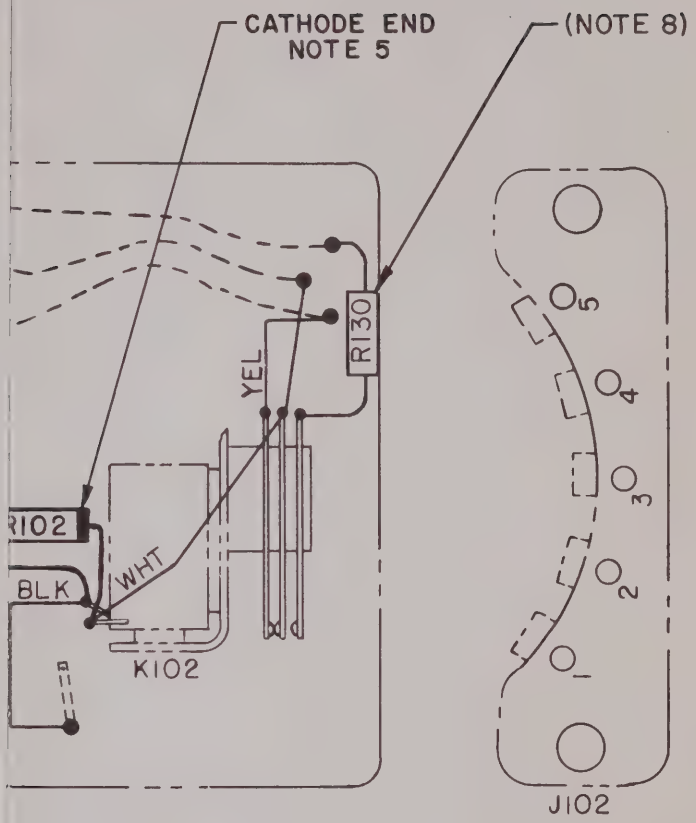






20766 G

Figure 6–13. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Megacycle Crystal Oscillator-Doubler, Wiring Diagram



R ASSEMBLY
SPLACED

RAM, SEE FIGURE 6-1.

ER ASSEMBLIES, SEE
URE 6-12.

WIRING.

FLON INSULATED.

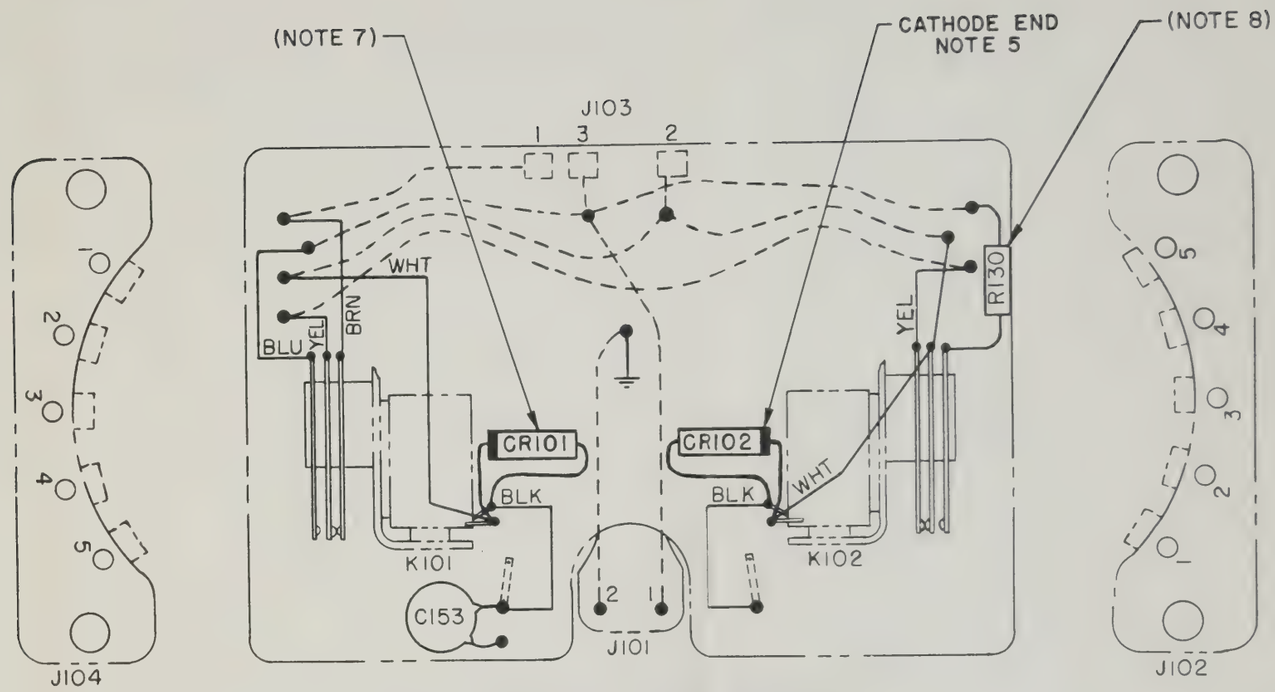
IODES INDICATES END
LDER ALL CRYSTAL
I AS PLIERS BETWEEN
ODY.

ND CR102 WERE ADDED.

CR102 WERE REMOVED.

20975I

Figure 6–14. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Tuner Assembly, Wiring Diagram



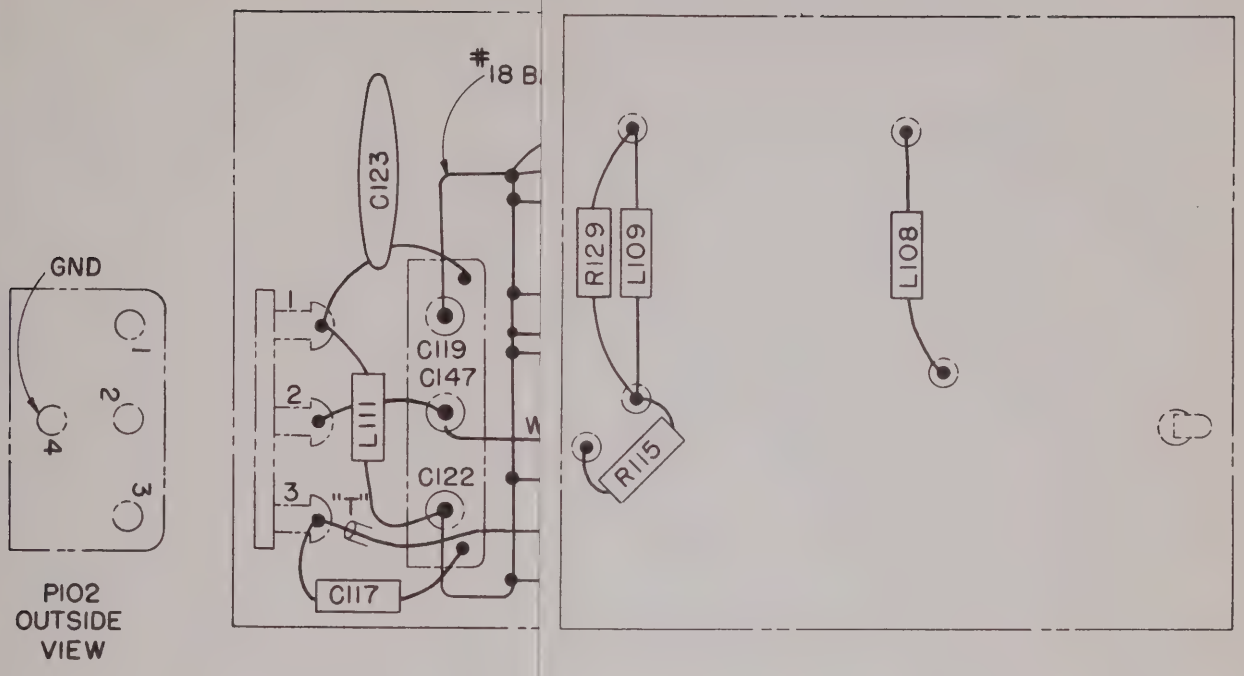
VIEW FROM TOP OF TUNER ASSEMBLY
WITH J102 AND J104 DISPLACED

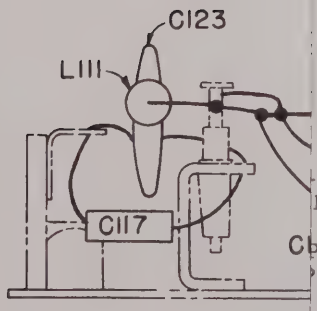
NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTION WITH OTHER ASSEMBLIES, SEE ASSOCIATED WIRING DIAGRAM, FIGURE 6-12.
3. DOTTED LINES INDICATE PRINTED WIRING.
4. WIRES ARE #24 SOLID COPPER, TEFLON INSULATED.
5. DARK BAND ON END OF CRYSTAL DIODES INDICATES END NEAREST COLOR CODING BAND. SOLDER ALL CRYSTAL DIODES USING A "HEAT SINK" SUCH AS PLIERS BETWEEN SOLDERING POINT AND CRYSTAL BODY.
6. IN M-6 AND HIGHER UNITS, CR101 AND CR102 WERE ADDED.
7. IN LATER M-10 UNITS, CR101 AND CR102 WERE REMOVED.
8. R130 USED ON 28 V UNITS ONLY.

20975I

Figure 6–14. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Tuner Assembly, Wiring Diagram





1.
E WIRING DIAGRAM,

PER, TEFLON INSULATED.
ER, UNLESS OTHERWISE

CLEARANCE.
BASE IN END VIEW.

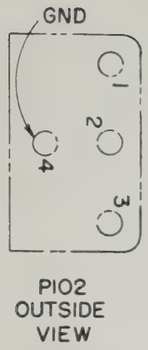
TY.

F APPROXIMATELY

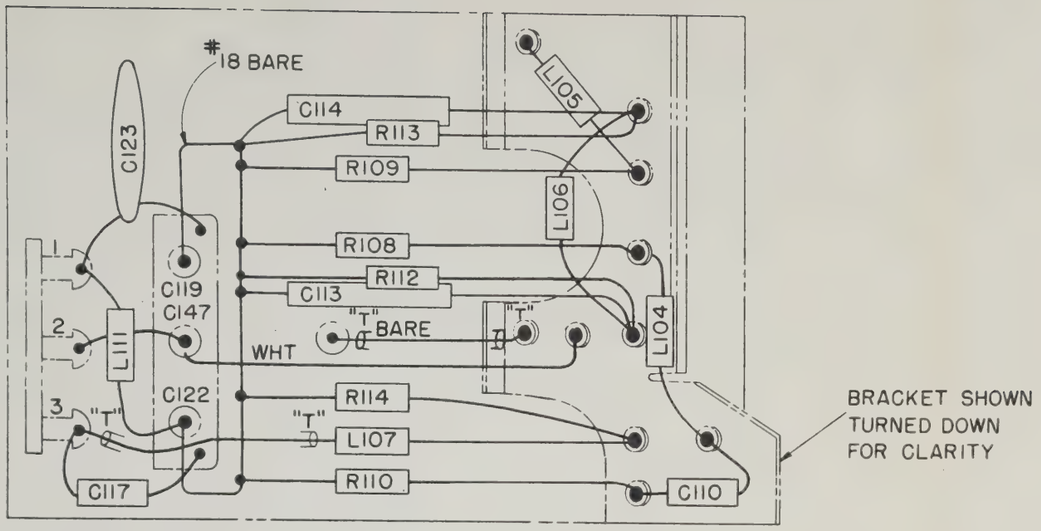
INYLITE TUBING OF

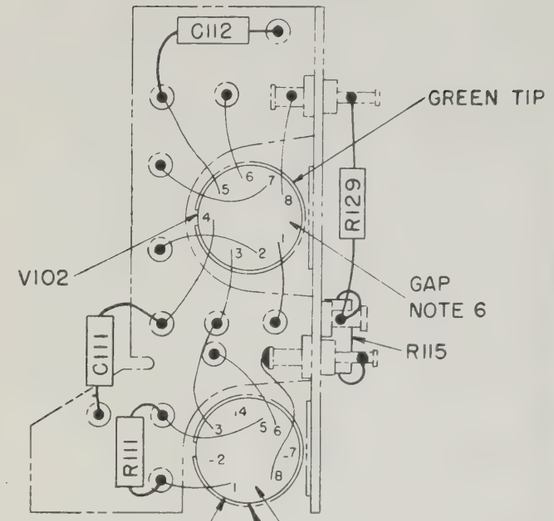
20767I

Figure 6–15. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Fractional Megacycle Oscillator-Balanced Mixer, Wiring Diagram

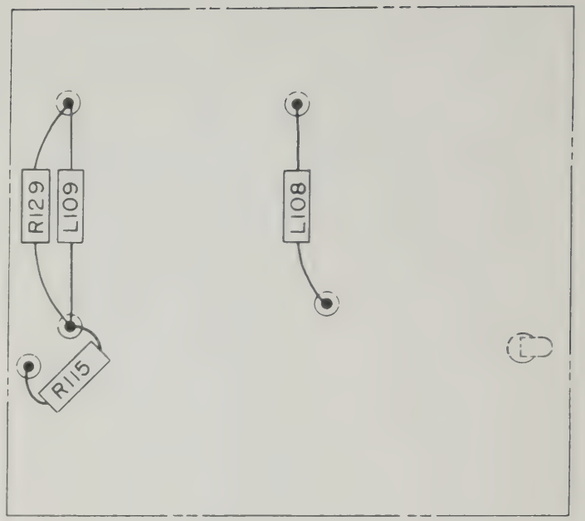


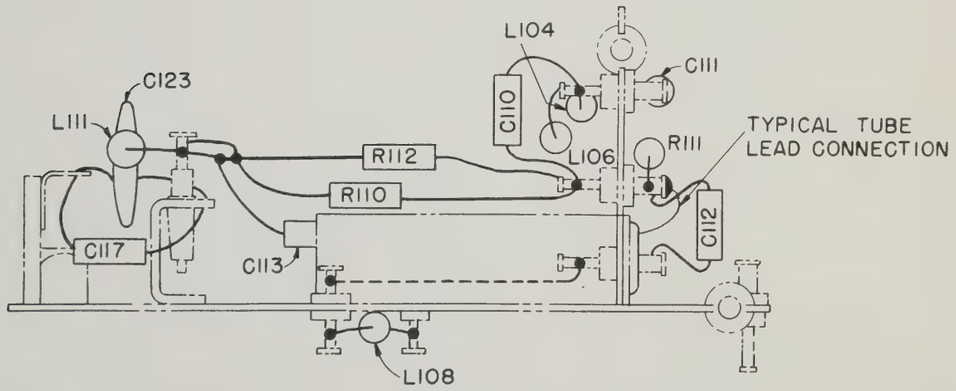
P102
OUTSIDE
VIEW





END VIEW



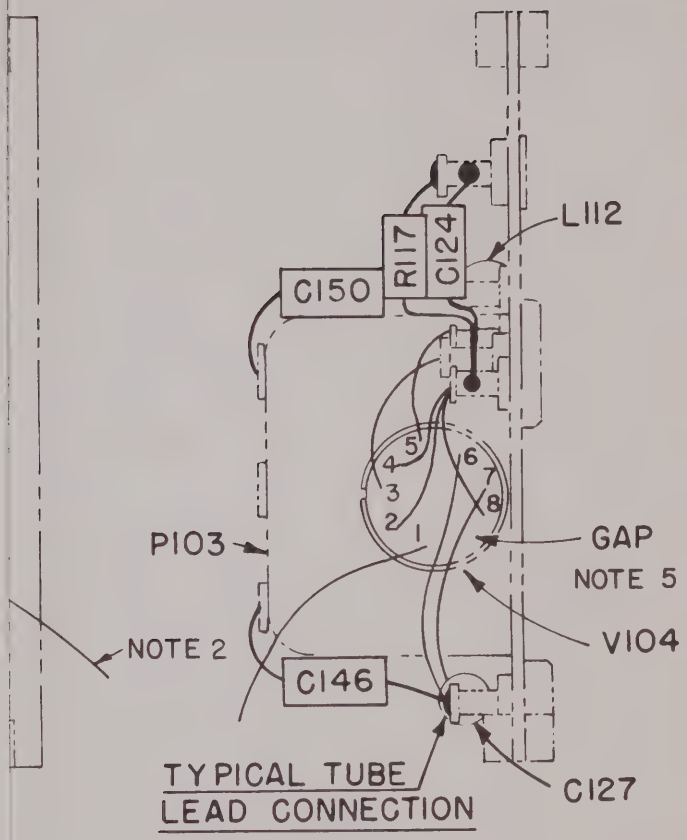


NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE WIRING DIAGRAM, FIGURE 6-12.
3. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
4. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER, UNLESS OTHERWISE SPECIFIED.
5. BARE TUBE LEADS ARE DRESSED WITH 1/16'' MINIMUM CLEARANCE.
6. ELECTRON TUBES V102 AND V103 ARE VIEWED TOWARD BASE IN END VIEW. ORIENT TUBES IN CLIPS AS SHOWN.
7. DUPLICATE SYMBOL NUMBERS ARE SHOWN FOR CLARITY.
8. FOR COMPLETE WIRING, SEE ALL VIEWS.
9. UNUSED TUBE LEADS NO. 2, 4, & 7 ON V103 ARE CUT OFF APPROXIMATELY 1/32'' FROM GLASS.
10. WIRE MARKED "T" IS COVERED WITH TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE.

207671

Figure 6–15. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, Fractional Megacycle Oscillator-Balanced Mixer, Wiring Diagram



1.

E WIRING DIAGRAM,

ER, TEFLON INSULATED.

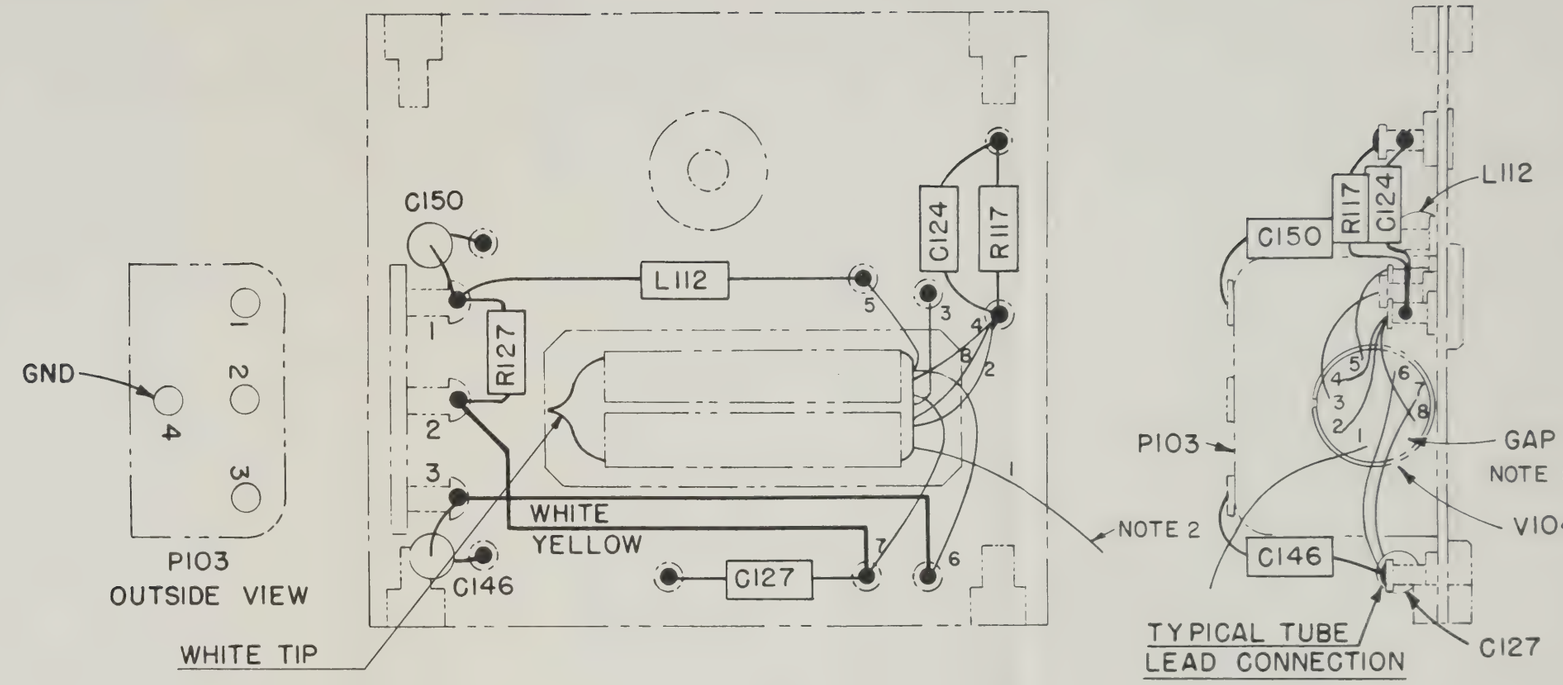
CLEARANCE.

VIEW. ORIENT TUBE

NTIFIED IN MORE THAN

20759E

Figure 6–16. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, R-f Amplifier, Wiring Diagram

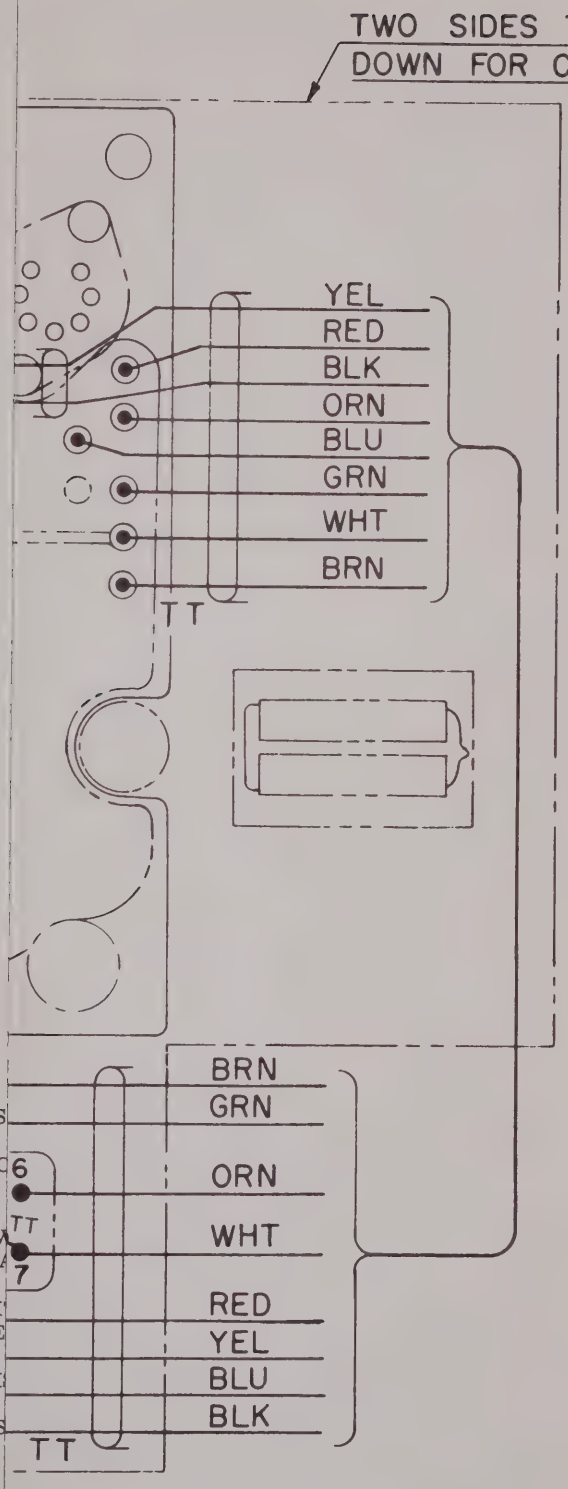


NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE WIRING DIAGRAM, FIGURE 6-12.
3. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
4. BARE TUBE LEADS ARE DRESSED WITH 1/16'' MINIMUM CLEARANCE.
5. ELECTRON TUBE V104 IS VIEWED TOWARD BASE IN END VIEW. ORIENT TUBE IN CLIP AS SHOWN.
6. WHEN REQUIRED FOR CLARITY, COMPONENTS ARE IDENTIFIED IN MORE THAN ONE VIEW.

20759E

Figure 6–16. ARC Type RT-11A Receiver-Transmitter, Transmitter Assembly, R-f Amplifier, Wiring Diagram

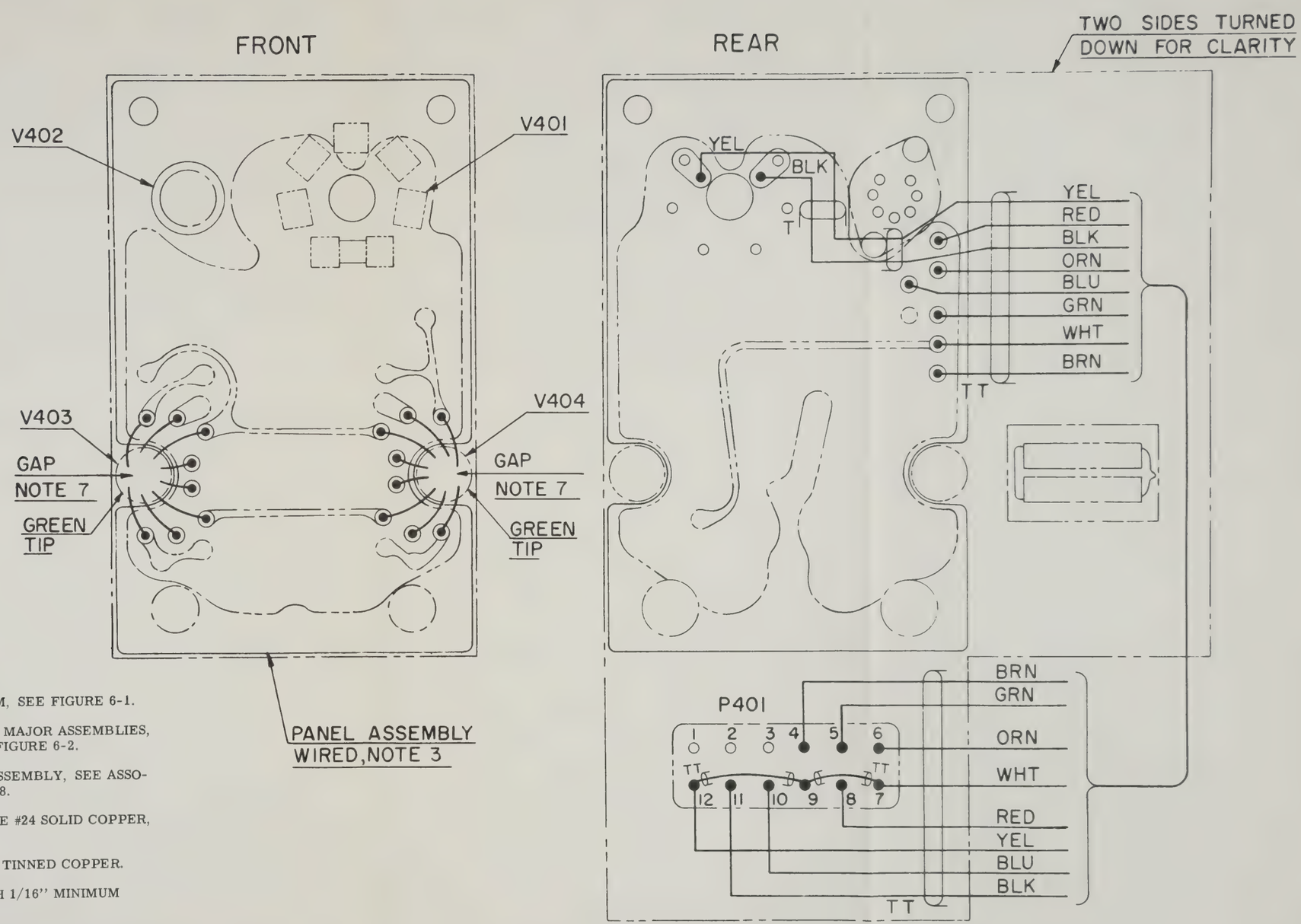


NOTES:

1. FOR ASSOCIATED S
2. FOR INTERCONNEC SEE MAIN CHASSIS
3. FOR ADDITIONAL W CIATED WIRING DI
4. WIRES MARKED WI TEFLON INSULATE
5. UNMARKED WIRE I
6. BARE TUBE LEADS CLEARANCE.
7. ELECTRON TUBES BASE ON FRONT VI
8. TRANSPARENT VIN IS INSTALLED ON
9. TRANSPARENT TE INSTALLED ON WI
10. FOR COMPLETE W

20813F

Figure 6–17. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Wiring Diagram

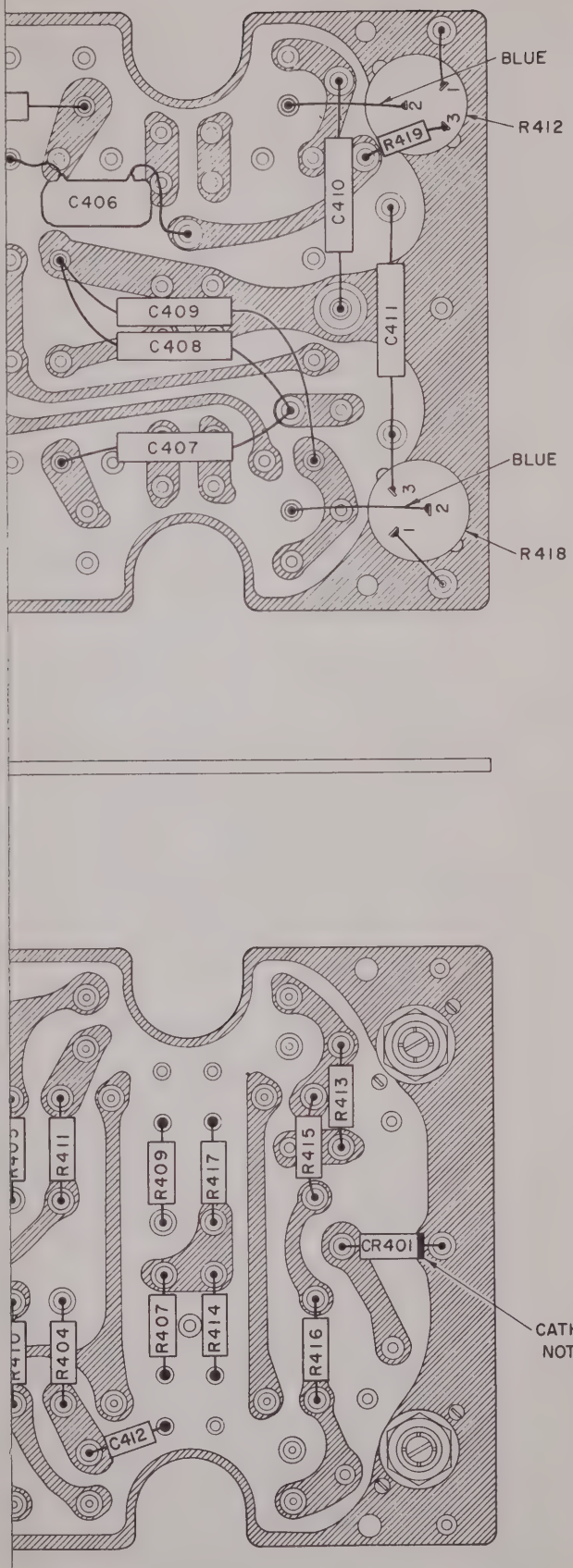


NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER MAJOR ASSEMBLIES, SEE MAIN CHASSIS WIRING DIAGRAM, FIGURE 6-2.
3. FOR ADDITIONAL WIRING OF PANEL ASSEMBLY, SEE ASSOCIATED WIRING DIAGRAM, FIGURE 6-18.
4. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
5. UNMARKED WIRE IS #24 BARE, SOLID, TINNED COPPER.
6. BARE TUBE LEADS ARE DRESSED WITH 1/16" MINIMUM CLEARANCE.
7. ELECTRON TUBES V403 AND V404 ARE VIEWED TOWARD BASE ON FRONT VIEW. ORIENT TUBES IN CLIPS AS SHOWN.
8. TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE IS INSTALLED ON GROUPS OF WIRES MARKED "T."
9. TRANSPARENT TEFLON TUBING OF APPROPRIATE SIZE IS INSTALLED ON WIRE OR GROUPS OF WIRES MARKED "TT."
10. FOR COMPLETE WIRING, SEE ALL VIEWS.

20813F

Figure 6–17. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Wiring Diagram

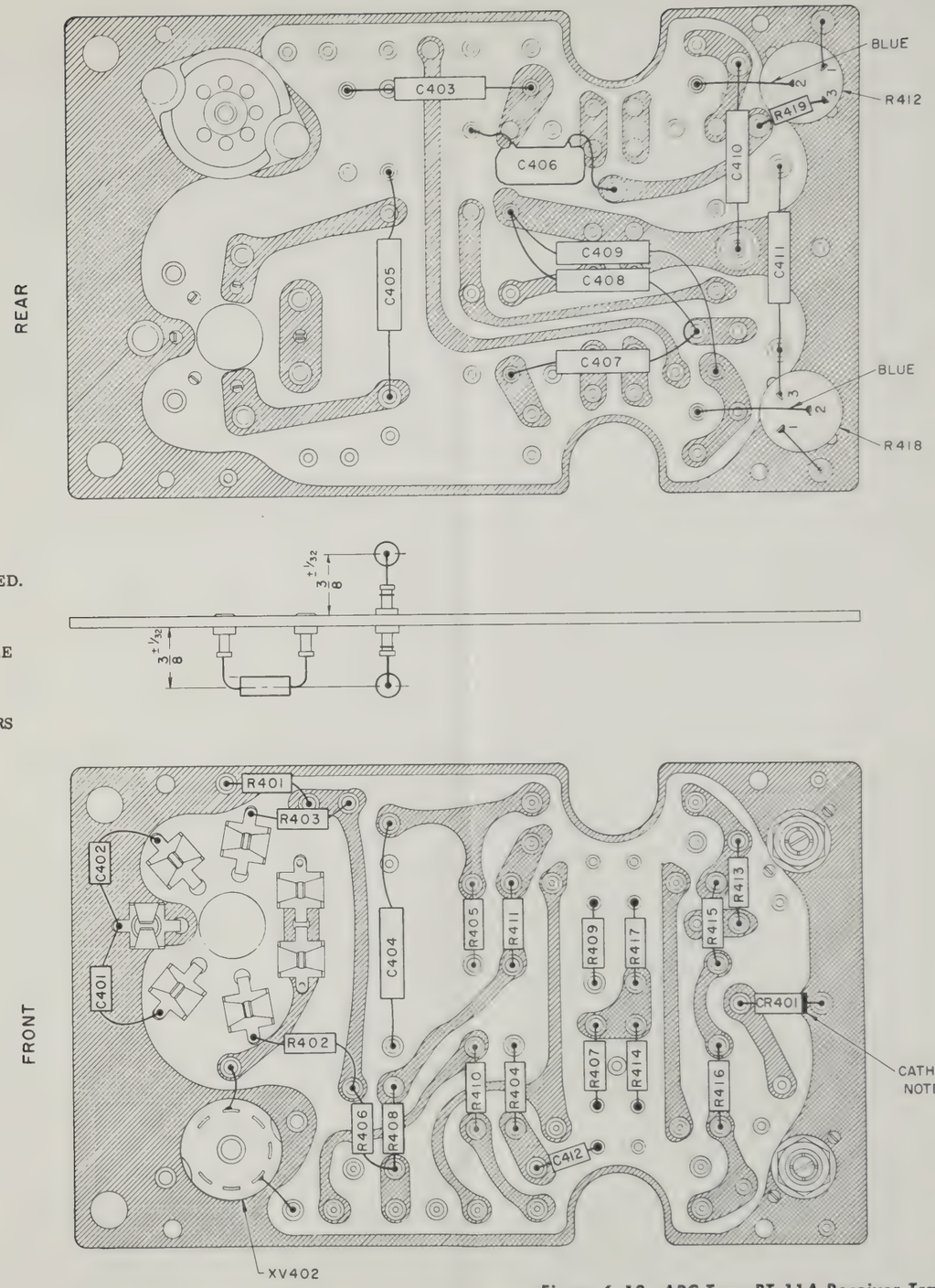


20361I

Figure 6–18. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Panel Assembly, Wiring Diagram

NOTES:

1. FOR ASSOCIATED SCHEMATIC DIAGRAM, SEE FIGURE 6-1.
2. FOR INTERCONNECTIONS WITH OTHER ASSEMBLIES, SEE WIRING DIAGRAM, FIGURE 6-17.
3. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
4. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.
5. SIDE ELEVATION SHOWS TYPICAL COMPONENT MOUNTING. MOST DETAILS ARE OMITTED FROM THIS VIEW.
6. DARK BAND ON END OF CRYSTAL DIODE INDICATES END NEAREST COLOR CODING BAND. SOLDER CRYSTAL DIODE USING A "HEAT SINK" SUCH AS PLIERS BETWEEN SOLDERING POINT AND CRYSTAL BODY.



20361I

Figure 6–18. ARC Type RT-11A Receiver-Transmitter, Modulator Assembly, Panel Assembly, Wiring Diagram

NOTES:

1. FOR WIRING DIAGRAM, SEE FIGURE 6-20
2. SWITCH SECTIONS S601A AND S601B ARE
   POSITION.
3. SWITCH SECTIONS S602A AND S602B ARE
   118.00-MC POSITION. FOR IDENTIFICAT
   TERMINALS, SEE FIGURE 6-20.
4. SWITCH TERMINALS ON S601 ARE VIEWE
   END OF SWITCH.
5. SHADED AREAS ON SWITCH SECTIONS S60
   INDICATE PLATED SURFACE. DOUBLE C
   AREAS ARE GROUNDED.
6. S602A CONTROLS TERMINAL GROUPS A, E
   H, I, J, K, L OF J601; S602B CONTROLS GR
   AT EACH POSITION OF S602A AND S602B
   TERMINALS IN EACH GROUP ARE GROUN
   OTHER TERMINALS OF THE GROUP ARE
   TOGETHER FREE OF GROUND. S601 SEL
   TWO CODING SEQUENCES FOR GROUP A,
   TABLE I.
7. FOR CONTINUITY SEQUENCE TABLE FOR
   S602B, SEE FIGURE 6-21.

TABLE 1. TABULATION OF GROUNDED
IN EACH GROUP (NOTE 7)

S602A	GROUP H, I, J, K, L	GROUP A, B, C, D, E S601 → SCS	GROUP A, B, C, D, E S601 → DCS	S
118	H, I, K	C, E	E	
119	H, I, J, L	A, D	A	
120	H, I, J, K	A, B, E	B	
121	I, J, K, L	B, C	C	
122	J, K, L	C, D	D	
123	K, L	D, E	A, E	
124	H, L	E	A, B	
125	I	A	A, B, C	
126	J	B	A, B, C, D	
127	K	C	B, C, D, E	
128	L	D	A, C, D, E	
129	H	A, E	B, D, E	
130	H, I	A, B	C, E	
131	I, J	A, B, C	A, D	
132	J, K	A, B, C, D	A, B, E	
133	H, K, L	B, C, D, E	B, C	
134	I, L	A, C, D, E	C, D	
135	H, J	B, D, E	D, E	

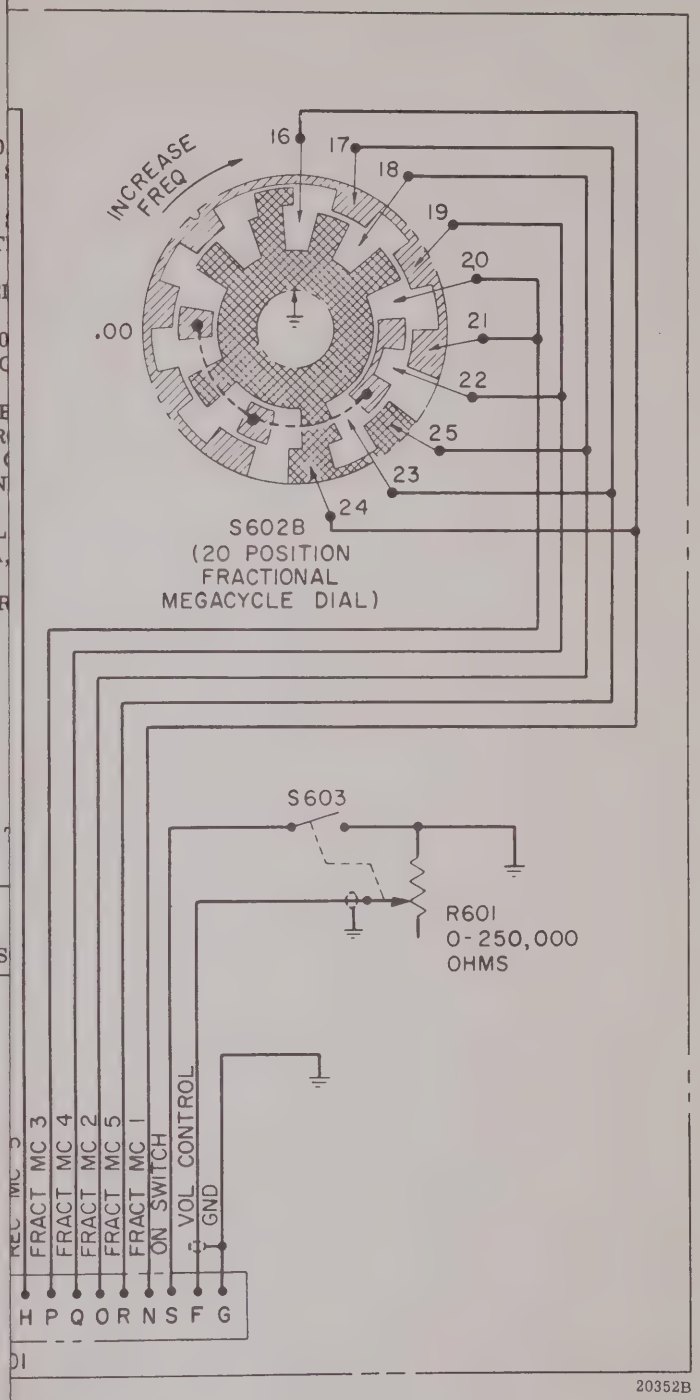


Figure 6–19. ARC Type C-67A Control Unit, Schematic Diagram

NOTES:

1. FOR WIRING DIAGRAM, SEE FIGURE 6-20.
2. SWITCH SECTIONS S601A AND S601B ARE SHOWN IN DCS POSITION.
3. SWITCH SECTIONS S602A AND S602B ARE SHOWN IN 118.00-MC POSITION. FOR IDENTIFICATION OF SWITCH TERMINALS, SEE FIGURE 6-20.
4. SWITCH TERMINALS ON S601 ARE VIEWED FROM KNOB END OF SWITCH.
5. SHADED AREAS ON SWITCH SECTIONS S602A AND S602B INDICATE PLATED SURFACE. DOUBLE CROSS-HATCHED AREAS ARE GROUNDED.
6. S602A CONTROLS TERMINAL GROUPS A, B, C, D, E AND H, I, J, K, L OF J601; S602B CONTROLS GROUP N, O, P, Q, R. AT EACH POSITION OF S602A AND S602B CERTAIN TERMINALS IN EACH GROUP ARE GROUNDED AND THE OTHER TERMINALS OF THE GROUP ARE CONNECTED TOGETHER FREE OF GROUND. S601 SELECTS BETWEEN TWO CODING SEQUENCES FOR GROUP A, B, C, D, E. SEE TABLE I.
7. FOR CONTINUITY SEQUENCE TABLE FOR S602A AND S602B, SEE FIGURE 6-21.

TABLE 1. TABULATION OF GROUNDED TERMINALS IN EACH GROUP (NOTE 7)

S602A	GROUP H, I, J, K, L	GROUP A, B, C, D, E S601 → SCS	GROUP A, B, C, D, E S601 → DCS	S602B	GROUP N, O, P, Q, R
118	H, I, K	C, E	E	.00	N, O
119	H, I, J, L	A, D	A	.05	N, O, P
120	H, I, J, K	A, B, E	B	.10	N, R
121	I, J, K, L	B, C	C	.15	N, O, P, Q
122	J, K, L	C, D	D	.20	Q
123	K, L	D, E	A, E	.25	O, P, Q, R
124	H, L	E	A, B	.30	P
125	I	A	A, B, C	.35	N, P, Q, R
126	J	B	A, B, C, D	.40	O
127	K	C	B, C, D, E	.45	O, Q, R
128	L	D	A, C, D, E	.50	N
129	H	A, E	B, D, E	.55	N, P, R
130	H, I	A, B	C, E	.60	R
131	I, J	A, B, C	A, D	.65	O, Q
132	J, K	A, B, C, D	A, B, E	.70	Q, R
133	H, K, L	B, C, D, E	B, C	.75	P, R
134	I, L	A, C, D, E	C, D	.80	P, Q
135	H, J	B, D, E	D, E	.85	N, Q
				.90	O, P
				.95	N, O, R

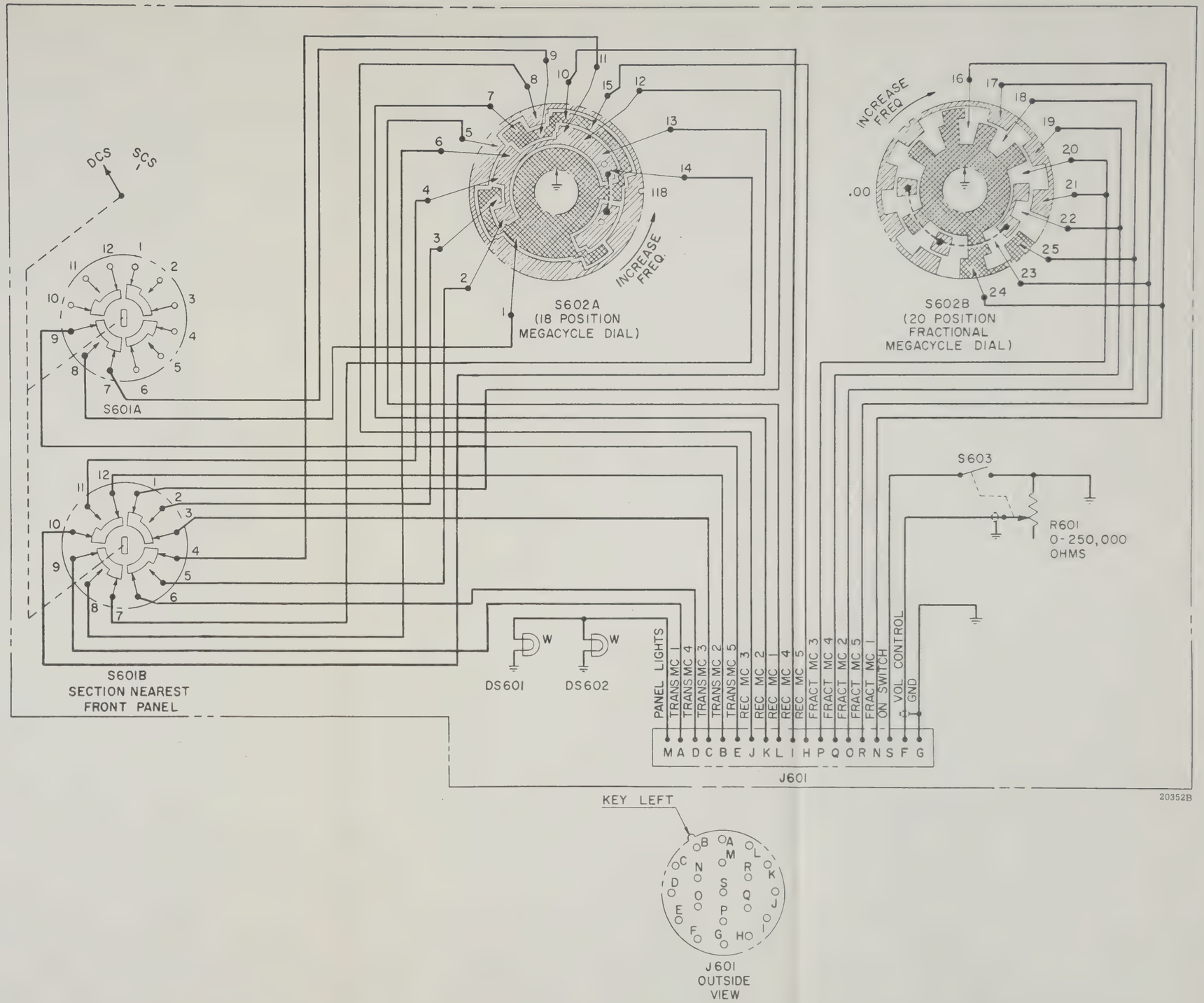
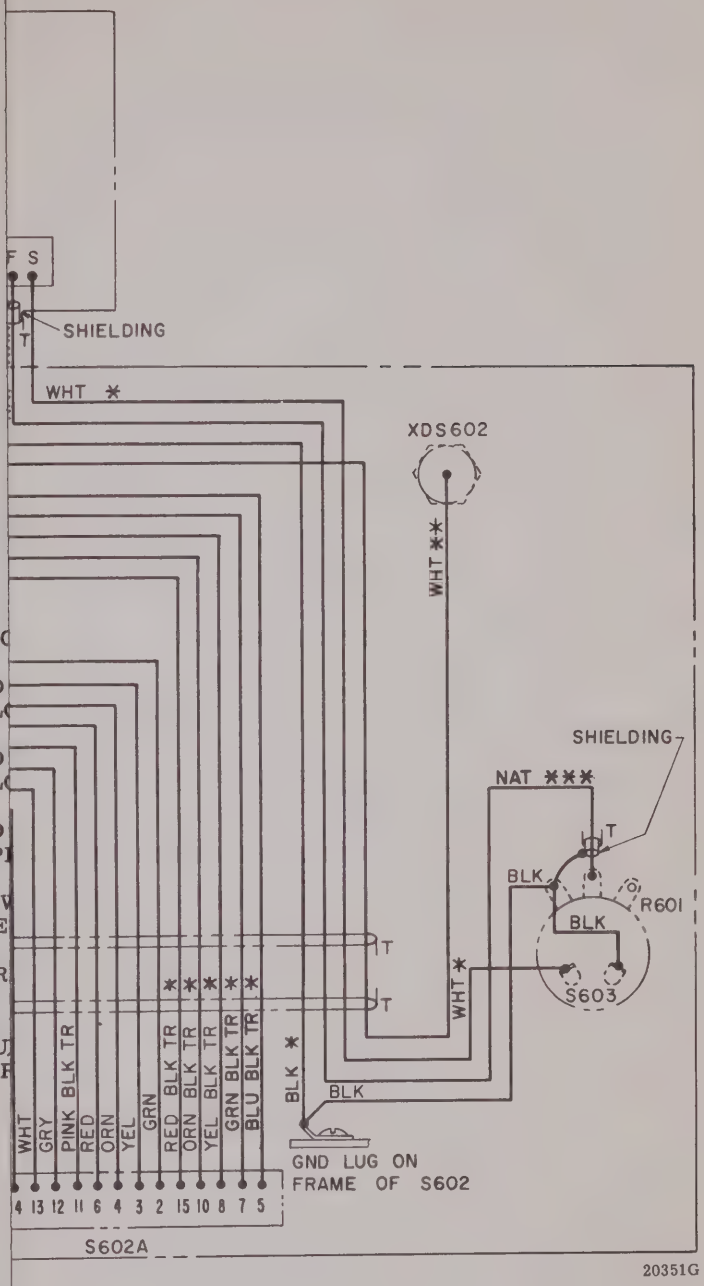
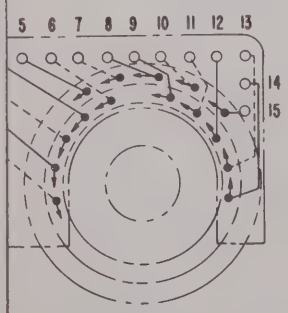


Figure 6–19. ARC Type C-67A Control Unit, Schematic Diagram

NOTES:

1. FOR SCHEMATIC
2. WIRES MARKED
   COPPER, TEFLO
3. WIRES MARKED
   COPPER, TEFLO
4. WIRES MARKED
   STRANDED COPI
5. WIRE MARKED V
   STRANDED SHIE
6. UNMARKED WIR
   COPPER.
7. WIRES OR GROU
   WITH TRANSPAR
   SIZE.



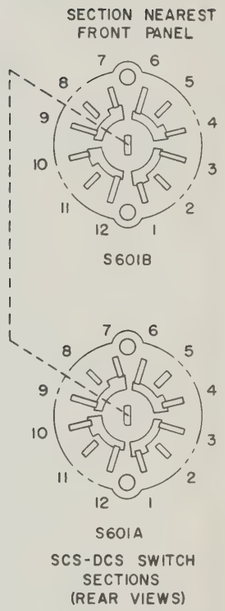


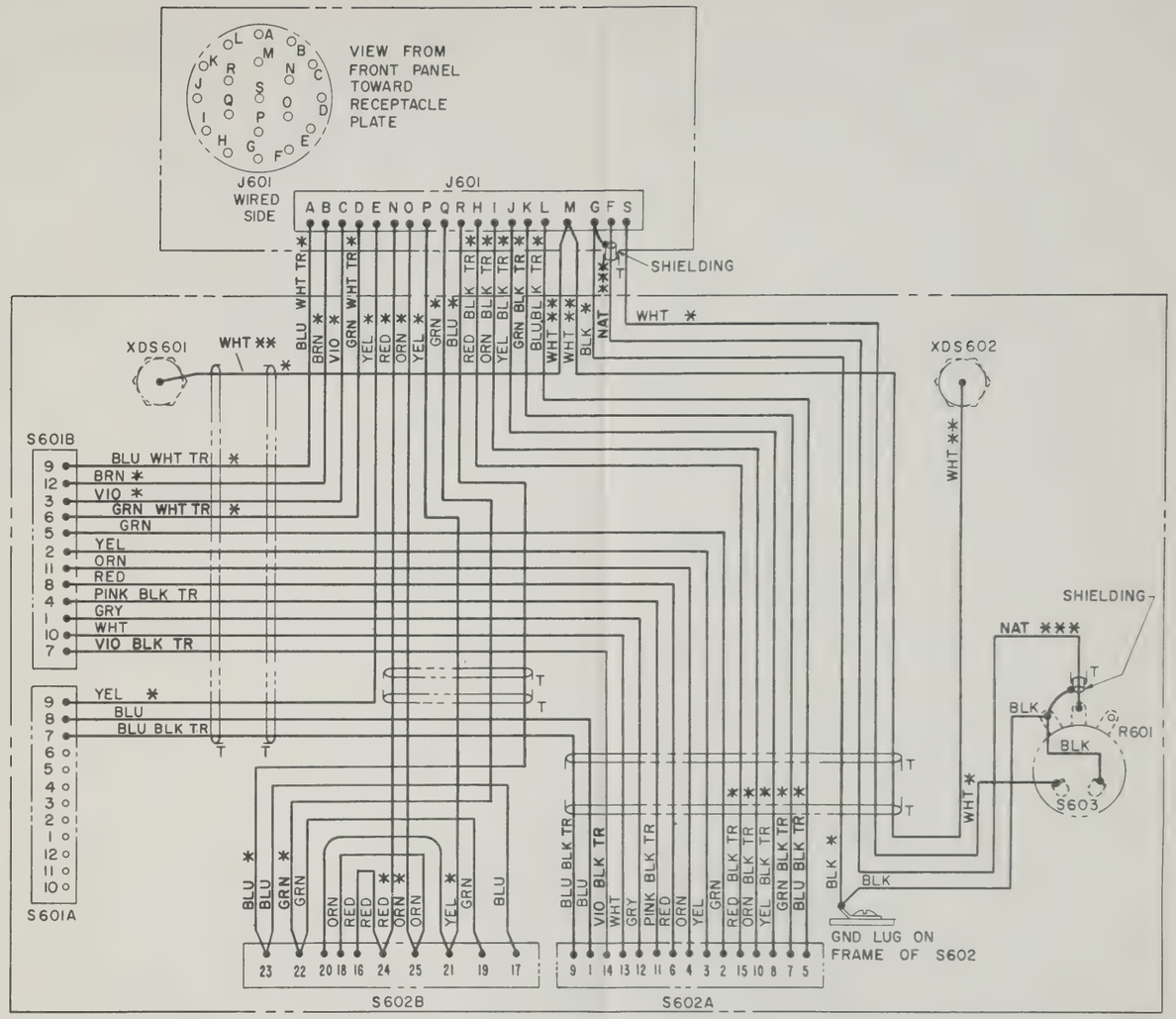
S602A
CHANNEL SWITCH
RIGHT SIDE WHEN
VIEWED FROM REAR

Figure 6–20. ARC Type C-67A Control Unit, Wiring Diagram

NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6-19.
2. WIRES MARKED WITH COLOR NOTE ARE #24 SOLID COPPER, TEFLON INSULATED.
3. WIRES MARKED BY AN ASTERISK (*) ARE #22 STRANDED COPPER, TEFLON INSULATED.
4. WIRES MARKED BY DOUBLE ASTERISK (**) ARE #20 STRANDED COPPER, TEFLON INSULATED.
5. WIRE MARKED WITH TRIPLE ASTERISK (***) IS #20 STRANDED SHIELDED COPPER, TEFLON INSULATED.
6. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.
7. WIRES OR GROUPS OF WIRES MARKED "T" ARE COVERED WITH TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE.





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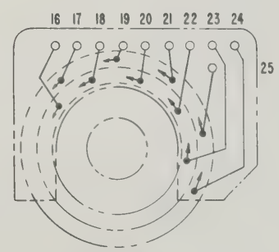

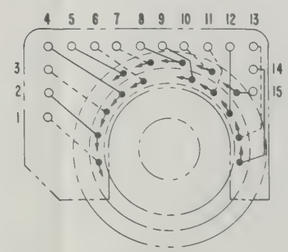

Figure 6–20. ARC Type C-67A Control Unit, Wiring Diagram

r MC Cycling			Switch Position (MC)	Fractional MC Cycling J601 Terminal				
J	K	L		N	O	P	Q	R
†	*	†	.00	*	*	†	†	†
*	†	*	.05	*	*	*	†	†
*	*	†	.10	*	†	†	†	*
*	*	*	.15	*	*	*	*	†
*	*	*	.20	†	†	†	*	†
†	*	*	.25	†	*	*	*	*
†	†	*	.30	†	†	*	†	†
†	†	†	.35	*	†	*	*	*
*	†	†	.40	†	*	†	†	†
†	*	†	.45	†	*	†	*	*
†	†	*	.50	*	†	†	†	†
†	†	†	.55	*	†	*	†	*
†	†	†	.60	†	†	†	†	*
*	†	†	.65	†	*	†	*	†
*	*	†	.70	†	†	†	*	*
†	*	*	.75	†	†	*	†	*
†	†	*	.80	†	†	*	*	†
*	†	†	.85	*	†	†	*	†
			.90	†	*	*	†	†
			.95	*	*	†	†	*

NOTES:

1. TRA
TO SCS
RECEIVEF

2. TO
POSITIONS
260, OR E
THAT POS
GROUND,
OF THE T
SWITCH P
WHICH TE
EACH OTF

(*) =
(†) =

3. AFT
REMOVE
TERMINA
TERMINA
FOR EXA
SELECTO
POSITION

TERM

4. USI
RT-11A C
FIGURE 6
THE RT-1
THE TABI

TP1515

Figure 6–21. Continuity Sequence Table for C-67A Channel Selector Switches S602A and S602B

NOTES:

1. TRANSMITTER MC CYCLING SYMBOLS WITHOUT PARENTHESES APPLY TO SCS OPERATION; SYMBOLS IN PARENTHESES, DCS OPERATION. RECEIVER MC CYCLING SYMBOLS APPLY TO EITHER SCS OR DCS OPERATION.

2. TO CHECK CONTINUITY OF ANY OF THE CHANNEL SELECTOR SWITCH POSITIONS LISTED IN THE TABLE, USE A VOLT-OHMMETER (SIMPSON MODEL 260, OR EQUIVALENT) AND SET THE RANGE SWITCH TO THE R X 1 SCALE SO THAT POSITIVE CONTACT MAY BE DETERMINED. CONNECT ONE LEAD TO GROUND, TERMINAL G OF J601, AND CONNECT THE OTHER LEAD TO EACH OF THE TERMINALS INDICATED. THE CORRECT CONTINUITY FOR THE SWITCH POSITION BEING CHECKED IS GIVEN BY THE FOLLOWING CODE IN WHICH TERMINAL LEADS HAVING THE SAME SYMBOL ARE CONNECTED TO EACH OTHER:

(*) = GROUNDED TERMINAL
(†) = UNGROUNDED TERMINAL AND CONNECTED TO OTHER TERMINALS MARKED (†)

3. AFTER CHECKING THE CONTINUITY OF EACH TERMINAL TO GROUND, REMOVE THE TEST LEAD FROM GROUND AND CONNECT IT TO ONE OF THE TERMINALS MARKED (†). THEN CHECK CONTINUITY WITH ALL OTHER TERMINALS MARKED (†) TO INSURE THAT THEY ARE CONNECTED TOGETHER. FOR EXAMPLE: ASSUMING DCS OPERATION AND THE MEGACYCLE CHANNEL SELECTOR SWITCH SET AT 124 MC, CORRECT CONTINUITY FOR THIS SWITCH POSITION WOULD BE:

TERMINAL OF J601	CORRECT CONTINUITY
A	(*) = GROUNDED
B	(*) = GROUNDED
C	(†) = UNGROUNDED, CONNECTED TO TERMINALS D AND E
D	(†) = UNGROUNDED, CONNECTED TO TERMINALS C AND E
E	(†) = UNGROUNDED, CONNECTED TO TERMINALS C AND D

4. USING THE TABLE, THE CONTINUITY OF ANY POSITION OF THE RT-11A CRYSTAL DRUM SWITCHES, MP101, MP102, AND MP301 (SEE FIGURE 6-1), CAN BE CHECKED BY TESTING THE TERMINALS OF J206 OF THE RT-11A. THE WIRING OF J206 IS IDENTICAL TO THAT OF J601 GIVEN IN THE TABLE.

Switch Position (MC)	Transmitter MC Cycling J601 Terminal					Receiver MC Cycling J601 Terminal					Switch Position (MC)	Fractional MC Cycling J601 Terminal				
	A	B	C	D	E	H	I	J	K	L		N	O	P	Q	R
118	† (†)	† (†)	* (†)	† (†)	* (*)	*	*	†	*	†	.00	*	*	†	†	†
119	* (*)	† (†)	† (†)	* (†)	† (†)	*	*	*	†	*	.05	*	*	*	†	†
120	* (†)	* *	† (†)	† (†)	* (†)	*	*	*	*	†	.10	*	†	†	†	*
121	† (†)	* (†)	* (*)	† (†)	† (†)	†	*	*	*	*	.15	*	*	*	*	†
122	† (†)	† (†)	* (†)	* (*)	† (†)	†	†	*	*	*	.20	†	†	†	*	†
123	† (*)	† (†)	† (†)	* (†)	* (*)	†	†	†	*	*	.25	†	*	*	*	*
124	† (*)	† (*)	† (†)	† (†)	* (†)	*	†	†	†	*	.30	†	†	*	†	†
125	* (*)	† (*)	† (*)	† (†)	† (†)	†	*	†	†	†	.35	*	†	*	*	*
126	† (*)	* (*)	† (*)	† (*)	† (†)	†	†	*	†	†	.40	†	*	†	†	†
127	† (†)	† (*)	* (*)	† (*)	† (*)	†	†	†	*	†	.45	†	*	†	*	*
128	† (*)	† (†)	† (*)	* (*)	† (*)	†	†	†	†	*	.50	*	†	†	†	†
129	* (†)	† (*)	† (†)	† (*)	* (*)	*	†	†	†	†	.55	*	†	*	†	*
130	* (†)	* (†)	† (*)	† (†)	† (*)	*	*	†	†	†	.60	†	†	†	†	*
131	* (*)	* (†)	* (†)	† (*)	† (†)	†	*	*	†	†	.65	†	*	†	*	†
132	* (*)	* (*)	* (†)	* (†)	† (*)	†	†	*	*	†	.70	†	†	†	*	*
133	† (†)	* (*)	* (*)	* (†)	* (†)	*	†	†	*	*	.75	†	†	*	†	*
134	* (†)	† (†)	* (*)	* (*)	* (†)	†	*	†	†	*	.80	†	†	*	*	†
135	† (†)	* (†)	† (†)	* (*)	* (*)	*	†	*	†	†	.85	*	†	†	*	†
											.90	†	*	*	†	†
											.95	*	*	†	†	*

TP1515

Figure 6–21. Continuity Sequence Table for C-67A Channel Selector Switches S602A and S602B

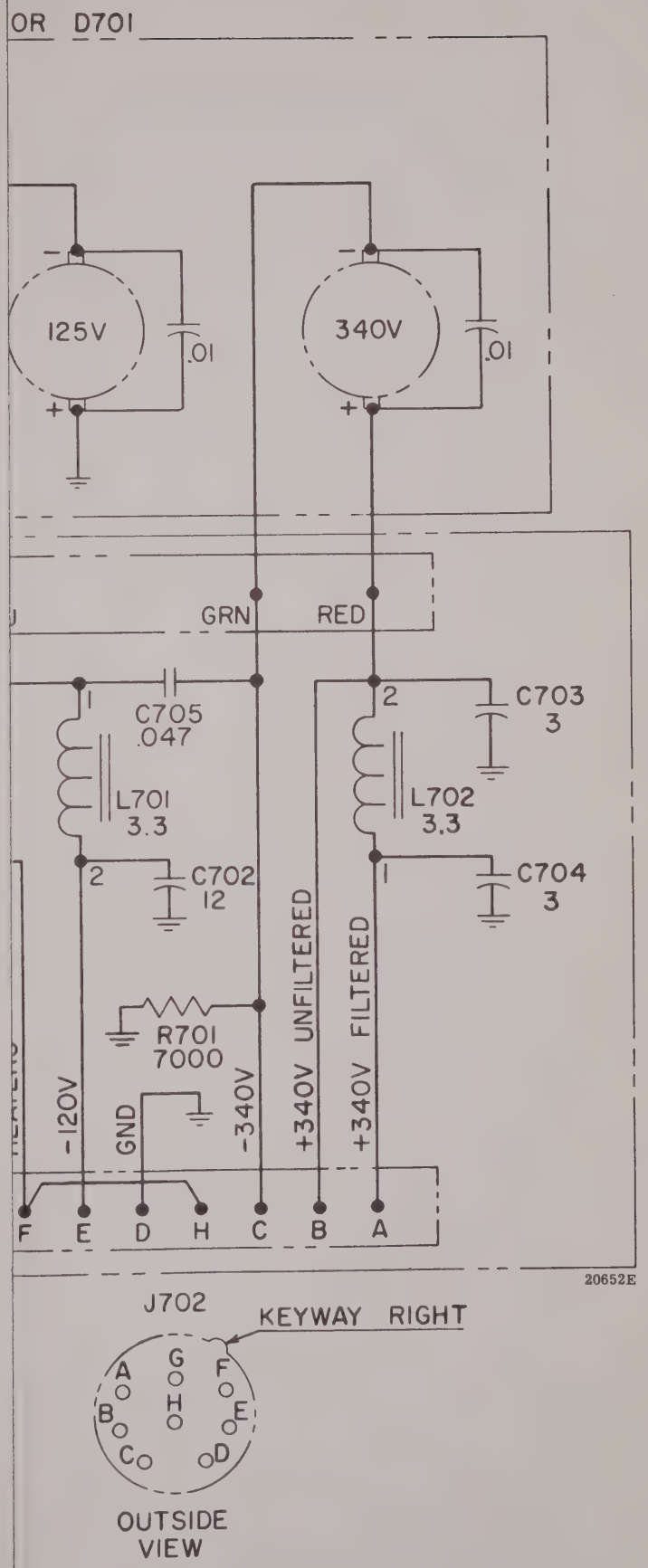

Figure 6–22. ARC Type P-15A Power Unit, Schematic Diagram

NOTES:

1. FOR WIRING DIAGRAM, SEE FIGURE 6-23.
2. RESISTANCE VALUE IS IN OHMS.
3. CAPACITANCE VALUES ARE IN MICROFARADS (μF).
4. INDUCTANCE VALUES ARE IN HENRIES (H).
5. RELAY IS IN UNENERGIZED POSITION.

ARC PART NUMBERS

Reference Designation	ARC Part No.
C701	8777
C702	8777
C703	8897
C704	8897
C705	8747
C706	8627
D701	20676(14V)
D701	20677(28V)
J701	12428
J702	12348
K701	20917
L701	20744
L702	20744
R701	206(7000)
Z701	20894

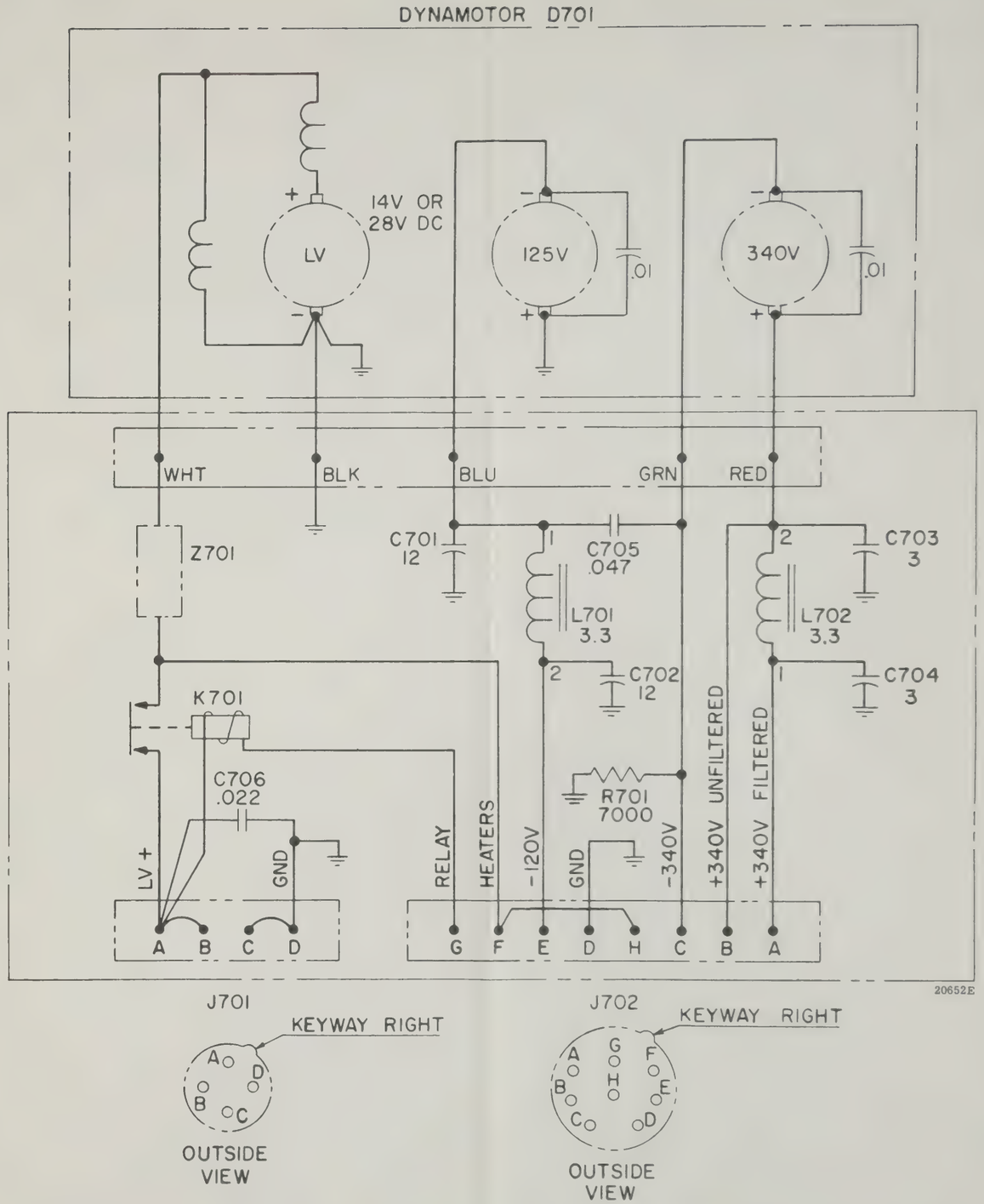

Figure 6–22. ARC Type P-15A Power Unit, Schematic Diagram

NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6-22.
2. WIRES MARKED WITH COLOR NOTE ARE #22 SOLID COPPER, VINYLITE INSULAT
3. WIRES MARKED WITH COLOR NOTE AND ASTERISK (*) ARE #18 STRANDED COPPE VINYLITE INSULATED.
4. UNMARKED WIRES ARE #22 BARE, SOLI TINNED COPPER.
5. TRANSPARENT VINYLITE TUBING OF APPROPRIATE DIAMETER AND 1-1/8" LONG IS INSTALLED OVER CAPACITOR SHELL FOR INSULATION.
6. TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE IS INSTALLED OVE WIRES MARKED —≡— .

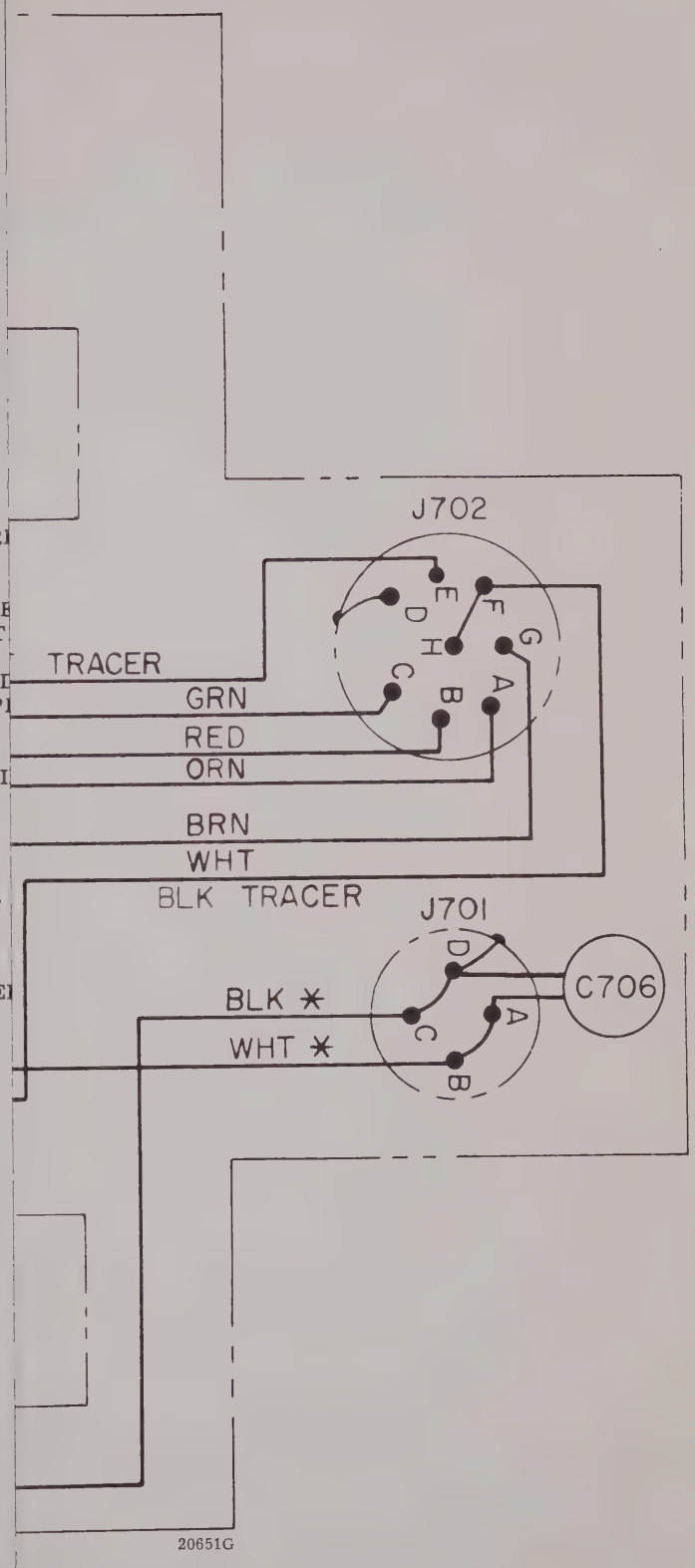

Figure 6–23. ARC Type P-15A Power Unit, Wiring Diagram

NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6-22.
2. WIRES MARKED WITH COLOR NOTE ARE #22 SOLID COPPER, VINYLITE INSULATED.
3. WIRES MARKED WITH COLOR NOTE AND ASTERISK (*) ARE #18 STRANDED COPPER, VINYLITE INSULATED.
4. UNMARKED WIRES ARE #22 BARE, SOLID, TINNED COPPER.
5. TRANSPARENT VINYLITE TUBING OF APPROPRIATE DIAMETER AND 1-1/8" LONG IS INSTALLED OVER CAPACITOR SHELL FOR INSULATION.
6. TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE IS INSTALLED OVER WIRES MARKED ⫤⫤ .

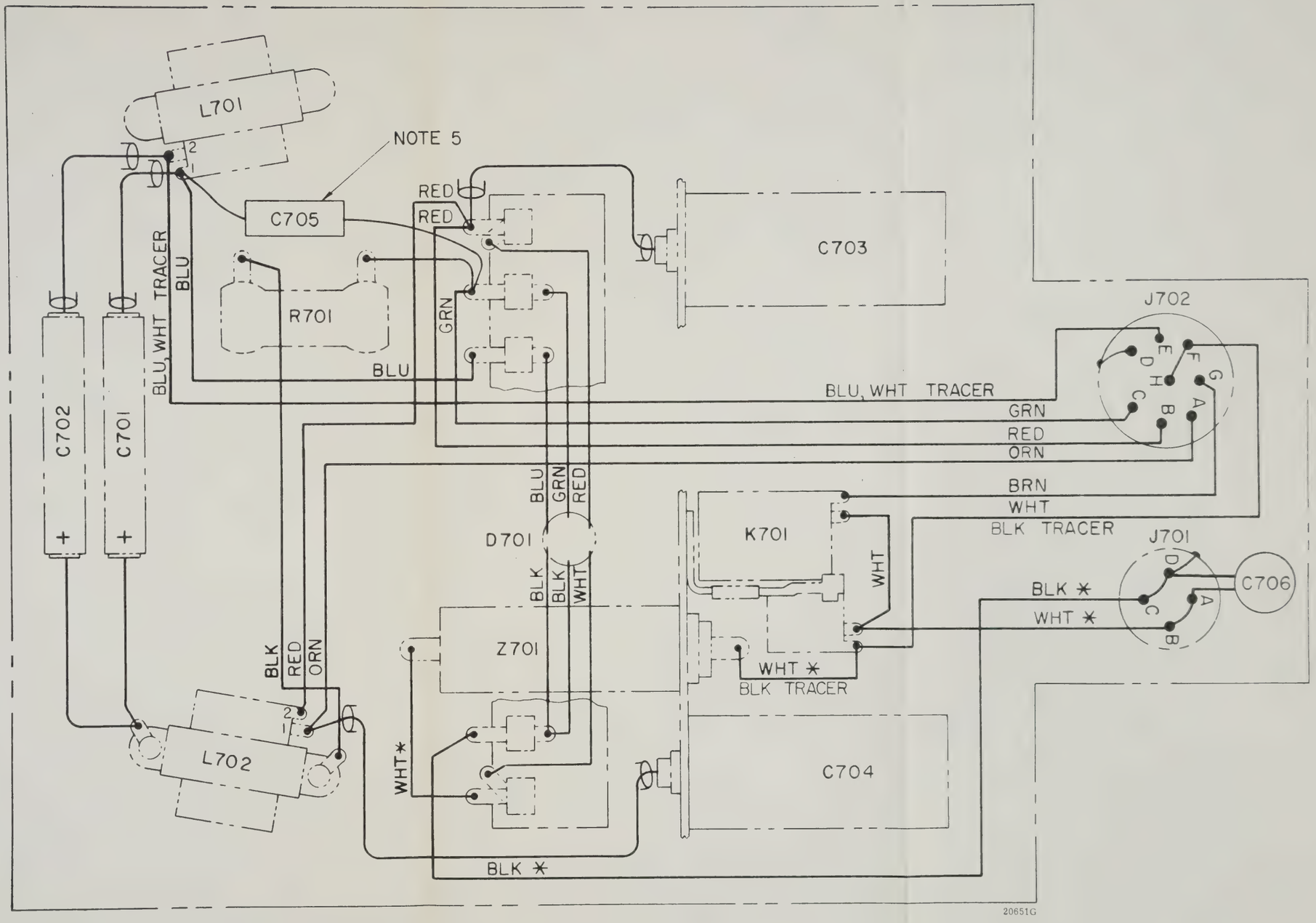

Figure 6–23. ARC Type P-15A Power Unit, Wiring Diagram

INSTRUCTIONS

FOR

CESSNA TRANSCEIVER 800 DYNAVERTER

CESSNA AIRCRAFT COMPANY

WICHITA, KANSAS

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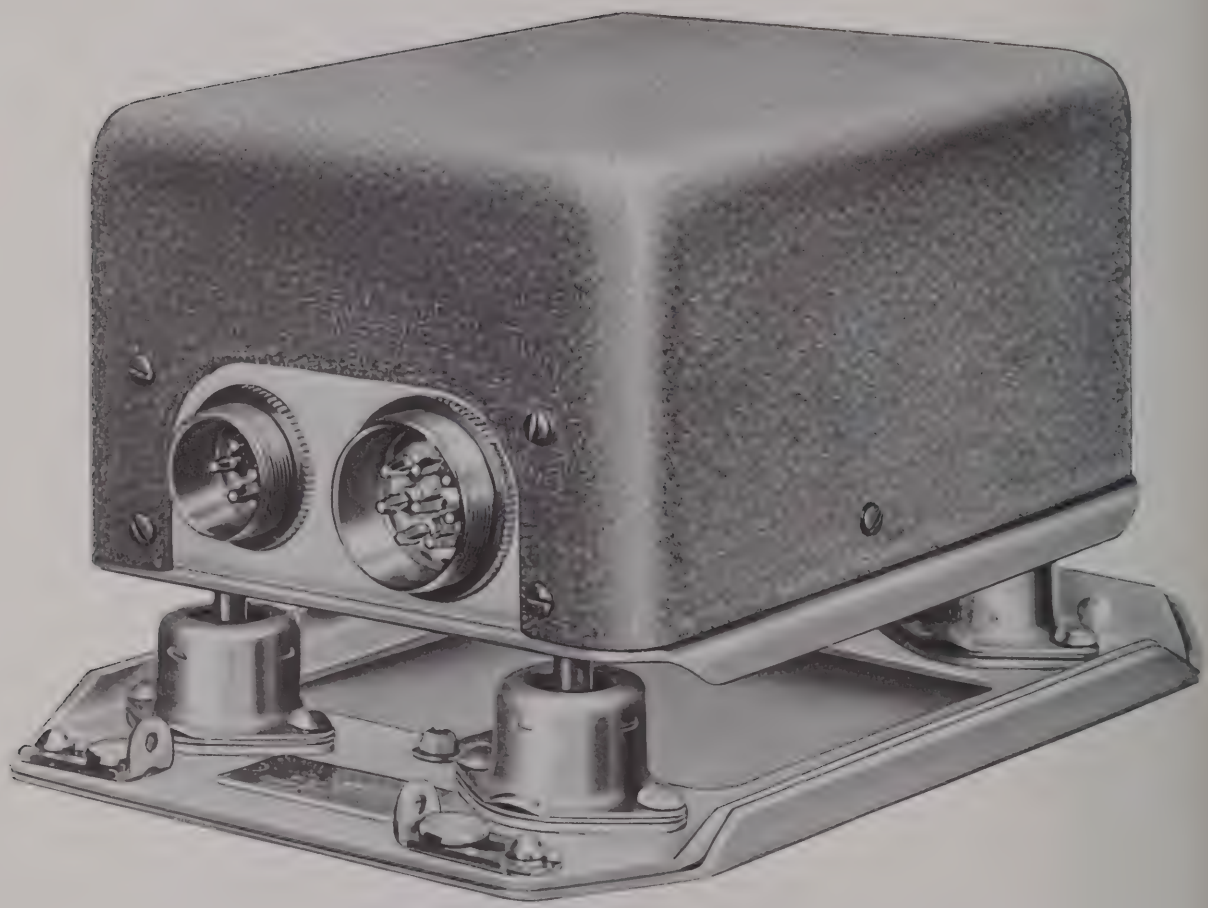

Figure 1. ARC Type DV-15A Dynaverter with ARC Type M-32A Mounting

TP14

GENERAL INFORMATION

ntroduction. This supplement to the instruction book for the ARC Type 210 VHF Communication Equipment :ontains installation, operation, principles of operation, maintenance, and parts information for the ARC Type)V-15A Dynaverter® .

?urpose. The DV-15A, shown in Figure 1, is a transistorized power converter designed to furnish all the)ias and high-voltage requirements for the ARC Type 210 Equipment. The DV-15A is mechanically and elec-rically interchangeable with the ARC Type P-15A Power Unit.

)pecifications.

?atings:	Receive condition: Input - 13.75 volts dc, 2.0 amperes or 27.5 volts dc, 1.2 amperes Outputs - 235 volts dc, 46 ma and 120 volts dc, 42 ma Transmit condition: Input - 13.75 volts dc, 6.5 amperes or 27.5 volts dc, 3.6 amperes Outputs - 340 volts dc, 200 ma and 110 volts dc, 48 ma
Mounting Required:	ARC Type M-32A
Weight:	3.8 pounds, less mounting 4.1 pounds, including mounting
)imensions:	5-7/16 in. wide, 4-3/8 in. high, 8-1/32 in. long overall, including mounting

)escription. The ARC Type DV-15A Dynaverter is a transistorized power converter designed to operate from he aircraft's primary d-c supply and furnish -120 volts and +340 volts dc. Under both transmit and receive :onditions, the -120-volt supply provides plate power for the fractional megacycle crystal oscillator and ·eceiver a-f power amplifier, and grid bias for the modulator output stage. During the receive condition, the ·340-volt rectifier circuit is connected to a tap on the secondary of the Dynaverter transformer to provide the ·eceiver with a plate power source of +220 volts. During the transmit condition, the full output of the +340-'olt rectifier circuit is used to supply high voltage to the transmitter power amplifier and modulator output :tage. The DV-15A also includes a transistorized protective circuit that cuts off the power converter when-:ver overload, input overvoltage, or input voltage surges occur. The power converter remains inoperative,)ut safe, until input power is removed and reapplied.

All parts of the DV-15A are mounted on an aluminum chassis that is secured to a shock-mounted rack assem-)ly. Flexible metal straps are attached to the shock mounts to ground the unit. The Dynaverter requires an ARC Type M-32A Mounting for installation.

All electrical connections are made through two connectors located on the front of the DV-15A.

OPERATION

The DV-15A Dynaverter has no operating controls; it is remotely controlled by the VOL-OFF volume control and power switch located on the C-67A Control Unit. However, the protective circuit of the DV-15A will op-:rate automatically whenever overload, input overvoltage, or input voltage surges occur, and cut off the high-'oltage and bias-voltage supplies for the Type 210 Equipment.

To clear the DV-15A protective circuit and return the Type 210 to normal operation, turn the C-67A VOL-)FF control fully counterclockwise to OFF position, then clockwise until the power switch reoperates. If the rouble condition has been cleared, the DV-15A will operate normally. If the trouble condition remains, the)rotective circuit will again operate and cut off the high-voltage and bias-voltage supplies.

INSTALLATION

Installation dimensions for the DV-15A Dynaverter with M-32A Mounting are shown in Figure 2. Mounting dimensions for the M-32A alone are shown in Figure 2-5 of the Type 210 instruction book. Since the DV-15A is mechanically and electrically interchangeable with the P-15A, install the DV-15A in accordance with the P-15A installation procedure given in paragraph 2-2 of the instruction book. The P-15A cabling information given in Figures 2-11 and 2-12 of the instruction book may also be used for connecting the DV-15A.

PRINCIPLES OF OPERATION

General. The DV-15A Dynaverter is a transistorized power converter designed to operate from the aircraft's d-c supply and furnish -120-volt and +340-volt dc outputs. The DV-15A supplies all the bias and high-voltage requirements of the RT-11A Receiver-Transmitter. As shown in the block diagram, Figure 3, The DV-15A consists of a power converter circuit, and a protective circuit that cuts off the power converter when overload, input overvoltage, or input voltage surges occur.

Power Converter Circuit. The power converter circuit consists of a multivibrator switching circuit, a dual-output power transformer, a full-wave rectifier for the -120-volt dc supply, and a full-wave bridge rectifier for the +340-volt dc supply. The principles of operation of the power converter circuit are as follows: Low-voltage dc from a primary source is applied to two high-power transistors connected in a self-excited multivibrator switching circuit. This circuit furnishes reversing-polarity square-wave pulses to the primary winding of the dual-output power transformer. The two secondary windings of the transformer provide square wave, alternating-current outputs that are rectified and filtered to provide the desired high-voltage d-c outputs. The magnitude of each voltage output depends on the primary-secondary turns ratio of the transformer. The transformer also has a center-tapped feedback winding that controls the switching action of the transistors.

A schematic diagram of the basic inverter circuit of the Dynaverter is shown in Figure 4. Assume that at the instant the circuit is energized a slight imbalance in transistors Q1 and Q2 causes more current to flow in winding 3 than in winding 2 of transformer T1. The flux in the transformer core begins to change toward saturation at a linear rate, since the product of the flux rate of change and the number of turns must equal the battery voltage (neglecting the small back voltage due to the IR drop).

The change in flux induces voltages in windings 1 and 4, making them positive at A and B. Therefore, the base of transistor Q2 becomes negative with respect to its emitter, and the base of transistor Q1 becomes positive with respect to its emitter. Under these conditions, Q2 becomes saturated (low resistance from emitter to collector) and Q1 is cut off (high resistance from emitter to collector).

When Q2 is saturated, almost all of the input voltage appears across winding 3, and the flux in the core of the transformer increases until saturation occurs. When the core becomes saturated, the flux ceases to change. Consequently, the induced voltages in windings 1 and 4 drop to zero, causing Q2 to cut off and the current in winding 3 to decrease.

The decrease of current in winding 3 causes a decrease of flux in the core of the transformer. This change of flux induces voltages of such polarity in windings 1 and 4 that they become negative at A and B. As a result, Q2 cuts off completely, Q1 becomes saturated, and current increases in winding 2 until saturation of the core occurs in the opposite direction. During this time, the voltages induced in windings 1 and 4 keep Q2 cut off and Q1 saturated. When the core of the transformer becomes saturated, the switching again takes place.

The switching action of the transistors continues to repeat. Current flows alternately in windings 2 and 3, inducing square-wave alternating voltages in the two secondary windings of the transformer. The frequency of the alternating wave output depends on the applied voltage, the number of turns in the primary winding, the cross-sectional area of the core, and the saturation flux density of the core. The DV-15A Dynaverter operates at approximately 2000 cps.

The schematic diagram for both the 14-volt and the 28-volt models of the DV-15A is shown in Figure 8. Basically, the circuits for the two models are the same. Because of the different input voltages, however, the power transistors, resistor values, and turns ratios of the transformers are different. Filter assembly Z802, connected in series with the low-voltage lead to the Dynaverter, prevents Dynaverter r-f noise from reaching the low-voltage supply. Capacitor C804 and Z802 also form a low-pass filter which aids the protective circuit in preventing possible transistor damage due to input power transients.

L801 and C805 are used to filter the output of the -125-volt, full-wave rectifier. Zener diode CR813, which is connected across L801, insures quick action of the protective circuit by shunting the resistance

of L801 whenever an overload occurs in the -125-volt circuit. R811, L802, C806, C807, and C808 filter the output of the +340-volt full-wave bridge rectifier. When the RT-11A is in the receive condition, HV relay K801 is not energized. With K801 unenergized, the +340-volt rectifier is connected to a tap on the transformer secondary so that a reduced output of +220 volts is available for the receiver circuits. When the RT-11A is in the transmit condition, K801 is energized, connecting the full output of the secondary to the rectifier so that the +340 volts is available for the transmitter circuits. Diode CR812, connected in series with the solenoid of power relay K802, prevents operation of the DV-15A if the input power leads are accidentally reversed in polarity.

Basic Operation of Protective Circuit. The protective circuit consists of overload sensing transistor Q805, main oscillator control transistor Q802, and bias oscillator transistor Q801 (see Figure 8). During normal operation of the DV-15A, Q802 conducts, providing a return path for the base currents of main oscillator transistors Q803 and Q804, and Q805 and Q801 are cut off. Q805 is the controlling element for the protective circuit. Whenever overload, input overvoltage, or input voltage surges occur, the protective circuit operates as follows: Q805 conducts, cutting off Q802 which, in turn, opens the base-current return for Q803 and Q804, stopping the main oscillator. Q805 also starts Q801 which generates a high-frequency output that is rectified and applied as cut-off bias to the bases of Q803 and Q804. (Cut-off bias for Q803 and Q804 is required to prevent thermal runaway of the collector cut-off currents at high ambient temperatures.)

The protective circuit will remain operative and the DV-15A inoperative until the primary power is removed and reapplied. If the trouble condition is cleared, Q805 will return to its normal cut-off condition, and the DV-15A will return to normal operation. If the trouble condition remains, however, Q805 will again conduct and the protective circuit will reoperate.

Detailed Operation of Protective Circuit.

Normal Operation. During normal operation of the DV-15A, overload sensing transistor Q805 is cut off. In addition, Q805 must be held cut off during the starting period when the oscillations are building up in main oscillator transistors Q803 and Q804; C803 and R807 provide the required time delay. When primary power is applied to the DV-15A, C803 begins to charge through R807. Before C803 can charge sufficiently to permit Q805 to conduct, the main oscillations reach normal amplitude; the emitters of Q803 and Q804 are then approximately 0.5 volt above ground during alternate half cycles. Once normal operation is established, diode CR805 conducts, continuously discharging C803 and holding Q805 cut off.

Main oscillator control transistor Q802 also requires special biasing provisions during the starting period to insure that it is always conducting. Before the main oscillations build up, the bases of Q803 and Q804 are returned, through Q802, to forward (negative) bias, furnished by voltage divider R803 and R804. Q802 is conducting at this time because its base is at a potential approximately equal to the primary supply voltage, and its emitter is connected to the junction of R803 and R804.

As soon as the main oscillations start to build up, the direction of current flow in R804 reverses so that, because of base current from Q803 and Q804, the junction of R803 and R804 rises to a potential higher than the primary voltage. To keep Q802 conducting under these conditions, its base must be connected to a potential higher than its emitter. The required voltage is obtained from a full-wave rectifier, CR802 and CR803, connected across the primary winding of T801. The rectifier output, which is approximately twice the primary supply voltage, is connected to the base of Q803 through voltage-dropping resistor R806. CR801 and R802 are connected in parallel with R804. When the main oscillations build up and the direction of current flow in R804 reverses, CR801 conducts, shunting R804 to reduce power losses and to prevent the build up of excessive current-limiting bias. R802 is a low-value resistor which provides the desired amount of current limiting.

Overload Operation. Whenever an overload condition occurs in one of the DV-15A outputs, the main oscillator voltage excursions in the primary of T801 will drop below their normal value, and the voltage appearing between emitter and collector (ground) of Q803 and Q804 will start to rise above the 0.5-volt reference value. When this emitter-collector voltage exceeds approximately 1 volt, CR805 will stop conducting, permitting C803 to charge, and Q805 will then conduct. When Q805 conducts, the base of Q802 is lowered in potential well below the potential of its emitter (determined by R803 and R804), and Q802 cuts off. When Q802 cuts off, the return path of Q803 and Q804 is opened, stopping the main oscillator. When Q805 conducts, it also starts bias oscillator Q801 by lowering the collector voltage of Q801 from approximately the primary voltage value to nearly ground potential. Q801 then oscillates at a frequency (approximately 150 kc) determined by the parallel resonant circuit of the capacitor and transformer primary in Z801. The a-c output from the secondary of the oscillator transformer is rectified by a crystal diode (in Z801) and applied to the bases of Q803 and Q804 to protect thermal runaway. Capacitor C801 is used to smooth the rectified output of the bias oscillator.

Overvoltage Operation. The DV-15A input circuit is protected against overvoltage by a Zener diode, CR804, connected between the base of main oscillator control transistor Q802 and ground. The diode is designed to break down at a voltage slightly higher than the maximum allowable input voltage. Whenever the input voltage

rises excessively, CR804 breaks down and clamps the base of Q802 at the Zener voltage value, but the emitte of Q802 rises with the input voltage so that Q802 cuts off. When Q802 cuts off, the balance of the protective circuit operates as follows: Q803 and Q804 are cut off and C803 begins to charge, permitting Q805 to conduct When Q805 conducts, Q802 is held cut off, and Q801 starts and furnishes protective bias for Q803 and Q804.

MAINTENANCE

General. Since the ARC Type DV-15A Dynaverter has no moving parts, periodic maintenance is not necessary. The following instructions will aid in isolating the cause of defective operation should a transistor or other part fail in service.

Test Equipment. The test equipment, or equivalent, shown in Figure 5 and listed in Table 1 is required to test the Dynaverter.

TABLE 1. TEST EQUIPMENT FOR DV-15A

Equipment	Model or Type	Use in Circuit
Ammeter (A4)	0 - 10 amperes dc	Input current
Primary Power Source	Electro Products Laboratories, Model NF, 0 - 30 volts dc, 0 - 10 amperes	
Milliammeter (A3)	0 - 100 ma dc	BIAS current
Milliammeter (A1)	0 - 100 ma dc	B+ FILT current
Milliammeter (A2)	0 - 250 ma dc	B+ UNFILT current
Resistor	2000 ohms, 50 watts	Load resistor, B+ UNFILT supply
Resistor	3000 ohms, 10 watts	Load resistor, BIAS supply
Resistor	5000 ohms, 20 watts	Load resistor, B+ FILT supply
Resistor	6400 ohms, 40 watts	Load resistor, B+ FILT supply
Resistor	9000 ohms, 10 watts	Load resistor, BIAS supply
Switch (S1)	Single-pole double-throw	B+ voltage
Switch (S2)	Single-pole triple-throw	Ripple voltage
Switch (S3)	Four-pole double throw	Receive-Transmit simulation
Switch (S4)	Single-pole single-throw	On-off
Voltmeter (V4)	0 - 50 volts dc	Input voltage
Voltmeter (V3)	0 - 150 volts dc	BIAS voltage
Voltmeter (V1)	0 - 500 volts dc	B+ voltage
Voltmeter (V2)	Hewlett-Packard Model 410B	Ripple voltage

Performance Check Chart. Table 2 outlines the procedure for checking Dynaverter performance. A bench test diagram is shown in Figure 5.

Note
Observe proper polarity when connecting the Dynaverter to the primary power source.

TABLE 2. DV-15A PERFORMANCE CHECK CHART

Step	Procedure	Normal Indication
1	Interconnect the Dynaverter, power supply, meters, and load resistors as shown in Figure 5. Remove the DV-15A dust cover.	None.
2	With switch S4 OFF, set S1 to FILT position, S2 to B+ UNFILT, and S3 to RECEIVE. Set Hewlett-Packard Model 410B (V2) to read 1 volt ac full scale. Adjust primary power source so that V4 indicates zero.	Input and output meters read zero.
3	Set S4 to ON position. With the DV-15A power relay, K802, hand-held in the energized position, slowly increase input voltage until the Dynaverter starts. Note Do not continue to increase input voltage if input current reaches 0.5 ampere before Dynaverter starts. Release relay K802. Decrease input voltage to zero.	V1 and V3 should indicate presence of output voltage as soon as input voltage is applied.
4	Slowly increase input voltage until relay K802 operates.	For either the 14-volt or 28-volt model, V4 should indicate 10 volts or less.
5	Slowly reduce input voltage until relay K802 releases.	For either the 14-volt or 28-volt model, V4 should indicate 3 volts or more.
6	Set S2 to BIAS position. Increase voltage to 13.75 volts (14-volt model) or 27.5 volts (28-volt model). Note Discontinue test if input current exceeds 2.7 amperes (14-volt model) or 1.8 amperes (28-volt model). If overload or short circuit conditions occur in either rectifier, the DV-15A protective circuit will operate. See Step 11.	For the RECEIVE condition, A4 should indicate less than 2.2 amperes (14-volt model) or 1.3 amperes (28-volt model). V1 should indicate between 225 and 240 volts, V2 less than 1.2 volts, and V3 between -120 and -130 volts. A1 should indicate approximately 46 ma and A3 approximately 42 ma.
7	Set S2 to B+ FILT position.	V2 should indicate less than 0.3 volt.
8	Set S2 to BIAS position. Set S3 to TRANSMIT. Recheck V4 for rated input voltage.	For TRANSMIT condition, A4 should indicate less than 6.8 amperes (14-volt model) or 3.8 amperes (28-volt model). V1 should indicate between 295 and 330 volts, V2 less than 3.0 volts, and V3 between -105 and -120 volts. A1 should indicate approximately 50 ma, A2 approximately 145 ma, and A3 approximately 50 ma.
9	Set S2 to B+ FILT position.	V2 should indicate less than 0.8 volt.
10	Set S1 to UNFILT position and S2 to B+ UNFILT position.	V1 should indicate between 320 and 350 volts, and V2 less than 7.0 volts.

TABLE 2. DV-15A PERFORMANCE CHECK CHART - Continued

Step	Procedure	Normal Indication
11	To check protective circuit operation, momentarily short B+ FILT output.	V1 and V3 should indicate zero volts. A4 should indicate approximately 0.2 ampere (14-volt model) or 0.3 ampere 28-volt model). The protective circuit should remain in operation after the short circuit is removed.
12	To return the DV-15A to normal operation, set S4 to OFF and then back to ON.	Normal currents and voltages for the TRANSMIT condition should be obtained.
13.	To recheck protective circuit operation, momentarily short BIAS output.	Conditions given in Step 11 should reappear
14	Repeat Step 12.	
15	Reduce input voltage to zero and disconnect Dynaverter.	

Localization of Trouble. Use a Simpson Model 260 Multimeter, or equivalent, for voltage, resistance, and continuity checks. The schematic and wiring diagrams for the DV-15A are shown in Figures 8 and 9. Voltages for the DV-15A during normal and protective operation are given in Table 3.

If the input current rises sharply as low voltage is gradually applied, a short circuit is indicated in the protective circuit or in the multivibrator switching circuit (transistors Q803 and Q804). To check power transistors Q803 and Q804, remove them from the DV-15A, and measure their resistances. The resistance as measured from collector to emitter (common test prod of multimeter connected to collector lead, positive test prod connected to emitter) should be much less than the resistance measured in the opposite direction. Similarly, the resistances measured from base (common) to emitter (positive) and from base (common) to collector (positive) should be much less than those in the opposite directions.

Note

Power transistors Q803 and Q804 are special types. Transistors ARC-20454 and ARC-21153 used in the 28-volt and 14-volt models, respectively, are identical to the 2N174 and 2N173 transistors, respectively, except that stranded leads are supplied instead of terminal pins. The base lead has green insulation; the collector is internally grounded to the case.

If the input current does not increase beyond 300 ma for the 28-volt unit or 200 ma for the 14-volt unit when rated input voltage is applied, it is an indication that the protective circuit is operating. The protective circu operates whenever overload, shorted output, or excessive input voltage occurs. Check the input voltage. Usi the multimeter, check the rectifier circuits for shorts. With the rectifier diodes disconnected from the circuit, check the forward and back resistances of the rectifier diodes. The back resistance should be much greater than the forward resistance in each case. (Specific resistances will depend on the meter and meter scale used.) If the trouble is suepected to be in the protective circuit itself, make point-to-point voltage checks and compare with the values given in Table 3. Check CR802, CR803, and R806.

Replacement of Parts. Figures 6, 7, 9, and 10 show the location of parts in the DV-15A. To remove parts soldered to the printed-circuit assembly of the DV-15A, partial disassembly is required as follows:

Step 1. Remove transistor Q801 from its mounting clamp on the chassis of the DV-15A.

Step 2. Remove the four No. 4 binding head screws fastening the printed-circuit assembly to the chassis

Step 3. Displace the printed-circuit assembly and its cabling by swinging the assembly upward toward the rear of the Dynaverter (viewed from the front).

Note

If it is necessary to remove bias oscillator assembly Z801, soldering iron heat should be applied simultaneously to all

soldered terminals of Z801. A special soldering iron tip is required for this procedure. Use a short length (approximately 4 inches) of No. 10 AWG, or larger, bus wire, and form it so that all transformer terminals can be contacted at the same time.

Step 4. To reassemble, reverse the procedures of Steps 1 through 3.

it is necessary to replace either power transistor Q803 or Q804, use a 5/16-inch Spintite wrench to loosen e nut securing the transistor to the main frame. Before mounting a replacement power transistor, apply a in coating of Dow-Corning 200 Silicone Fluid (1000 centistokes) to the bottom surface of the transistor. nce transistors Q802 and Q805 are plug-in types, no special procedure is required for their replacement. .1 diodes and transistor Q801 are soldered in position; their locations and polarities are shown in Figure 9. hen soldering or unsoldering a diode or transistor lead, hold the lead with pliers between the solder int and the diode or transistor. The pliers form a heat sink and prevent excessive heat from damaging the it. Do not remove the pliers until the heat from the soldered joint has been dissipated.

TABLE 3. DV-15A OPERATING VOLTAGES

otes:

1. Voltage measurements made with a 20,000 ohms-per-volt voltmeter such as Simpson Model 260 Multimeter, or equivalent. Voltages are dc and are measured with respect to chassis ground.
2. Voltages shown in parentheses are for 14-volt model.

Ref Desig	Test Point	Normal Operation D-c volts	Protective Operation D-c volts
J801	Pin A	27.5(13.5)	27.5(13.5)
CR812	Anode	0.75	0.75
	Cathode	0	0
J802	Pins F & H	27.5(13.5)	27.5(13.5)
Z802	Input	27.5(13.5)	27.5(13.5)
	Output	27.5(13.5)	27.5(13.5)
Q802	Emitter	30.5(18.0)	19.5(10.9)
	Base	32.0(19.0)	19.5(11.0)
	Collector	32.0(18.5)	37.5(16.0)
Q803	Emitter	27.5(13.5)	27.5(13.5)
	Base	32.0(18.8)	37.5(16.0)
	Collector	0	0
Q804	Emitter	27.5(13.5)	27.5(13.5)
	Base	32.0(18.8)	37.5(16.0)
	Collector	0	0
Q805	Emitter	0.68(0.66)	4.0(2.6)
	Base	0.76(0.74)	4.4(3.0)
	Collector	27.5(13.5)	4.9(3.5)
Q801	Emitter	27.1(13.5)	22.0(12.5)
	Base	27.1(13.5)	28.5(17.5)
	Collector	27.1(13.5)	5.0(3.5)
CR813	Anode	-130 TRANS -137 REC	0
J802	Pin E	-115 TRANS -125 REC	0
	Pin B	360 TRANS 257 REC	0
R811 & L802	Junction	345 TRANS 245 REC	0
J802	Pin A	340 TRANS 230 REC	0
	Pin C	0 TRANS -125 REC	

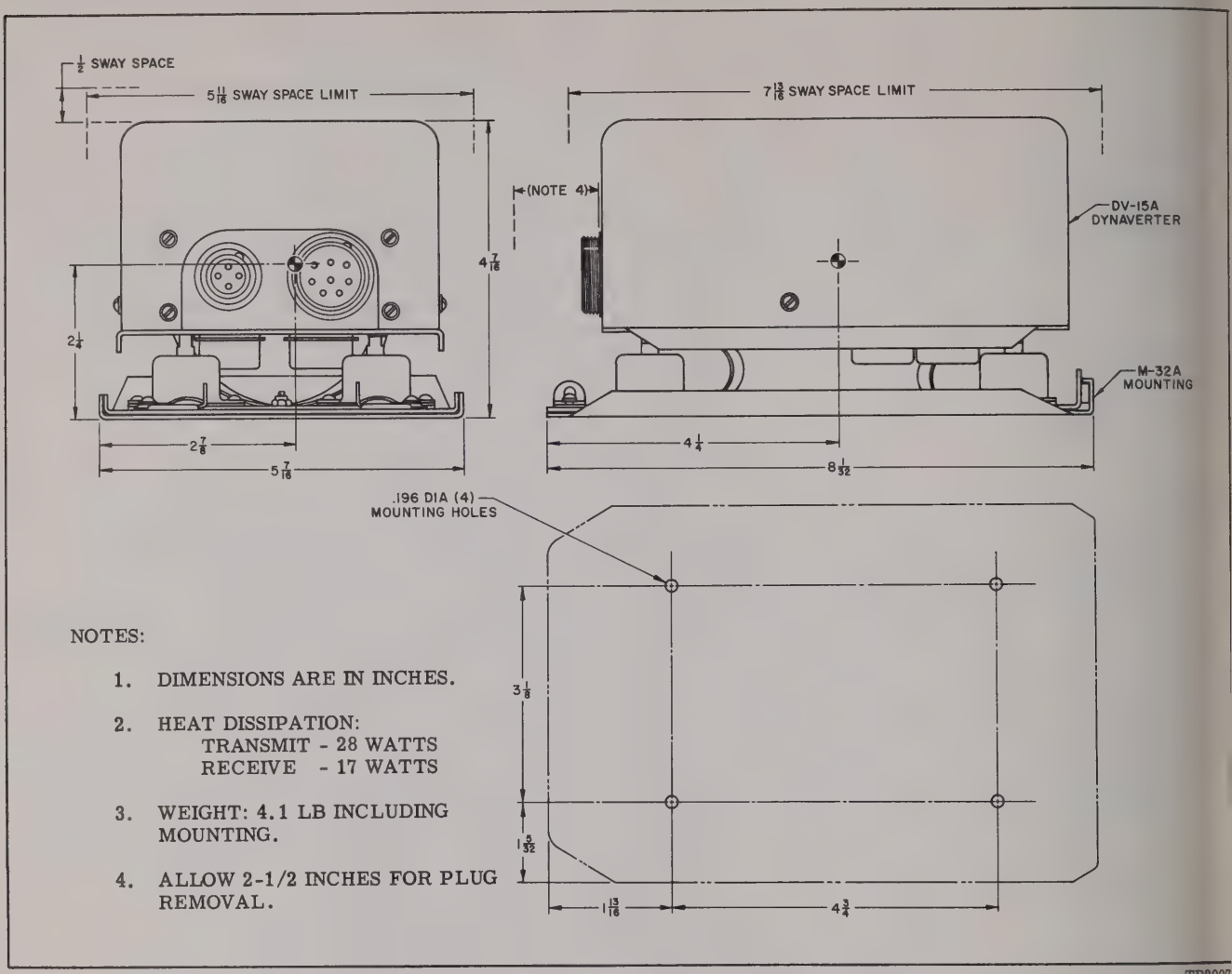

Figure 2. DV-15A Dynaverter, Installation Dimensions

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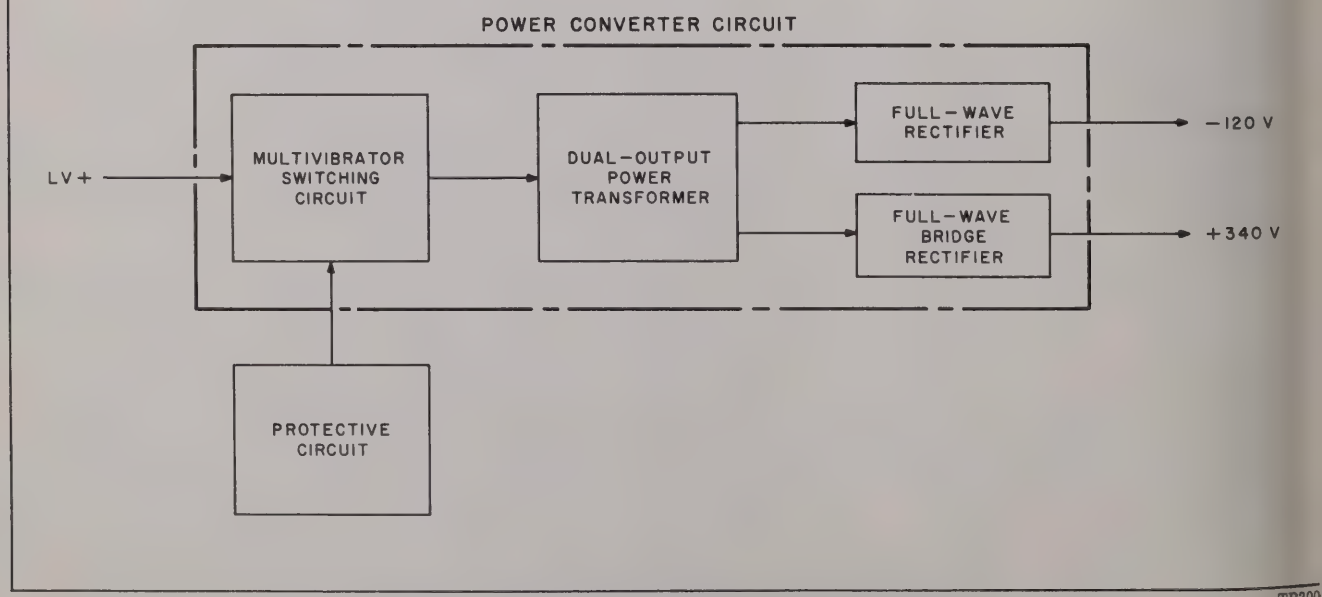

Figure 3. DV-15A Dynaverter, Block Diagram

TP200

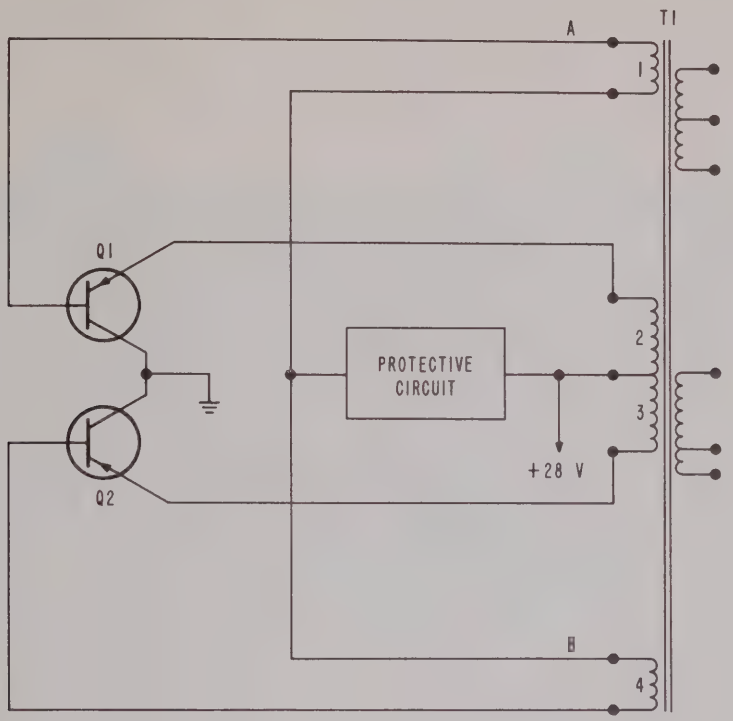

Figure 4. Basic Transistor Inverter Circuit

TP2011

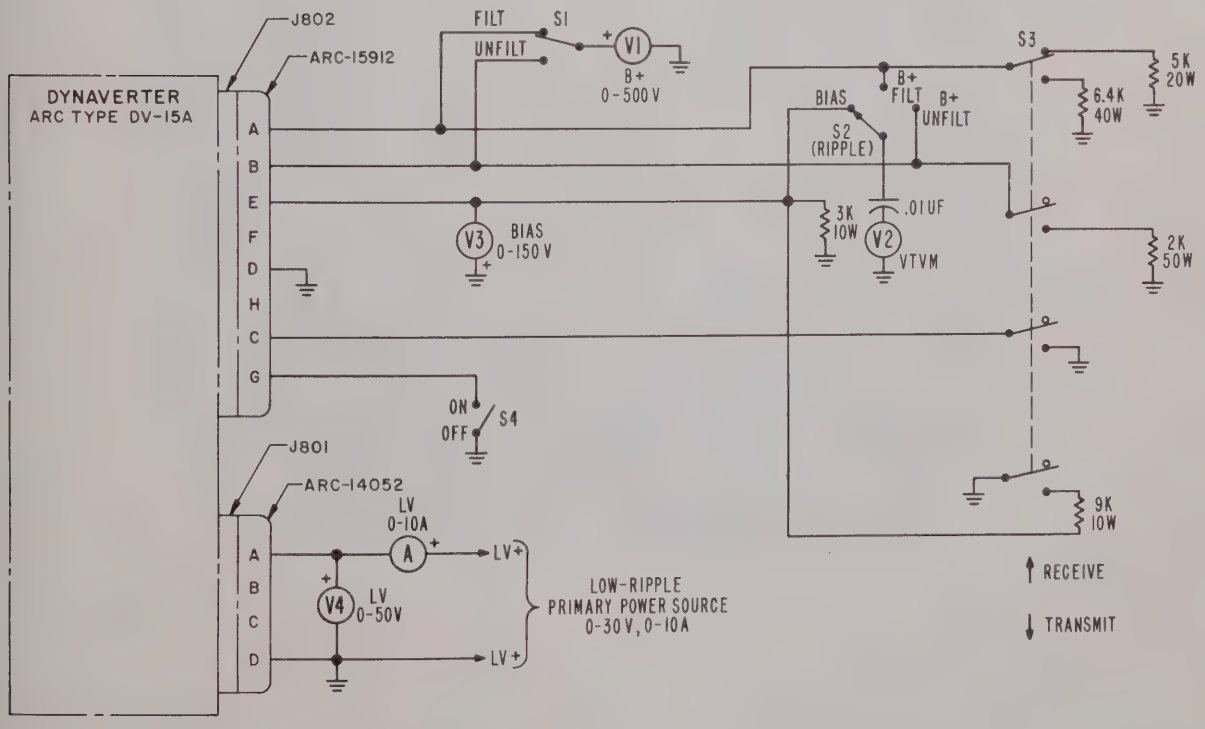

Figure 5. DV-15A Dynaverter, Test Circuit

TP1947

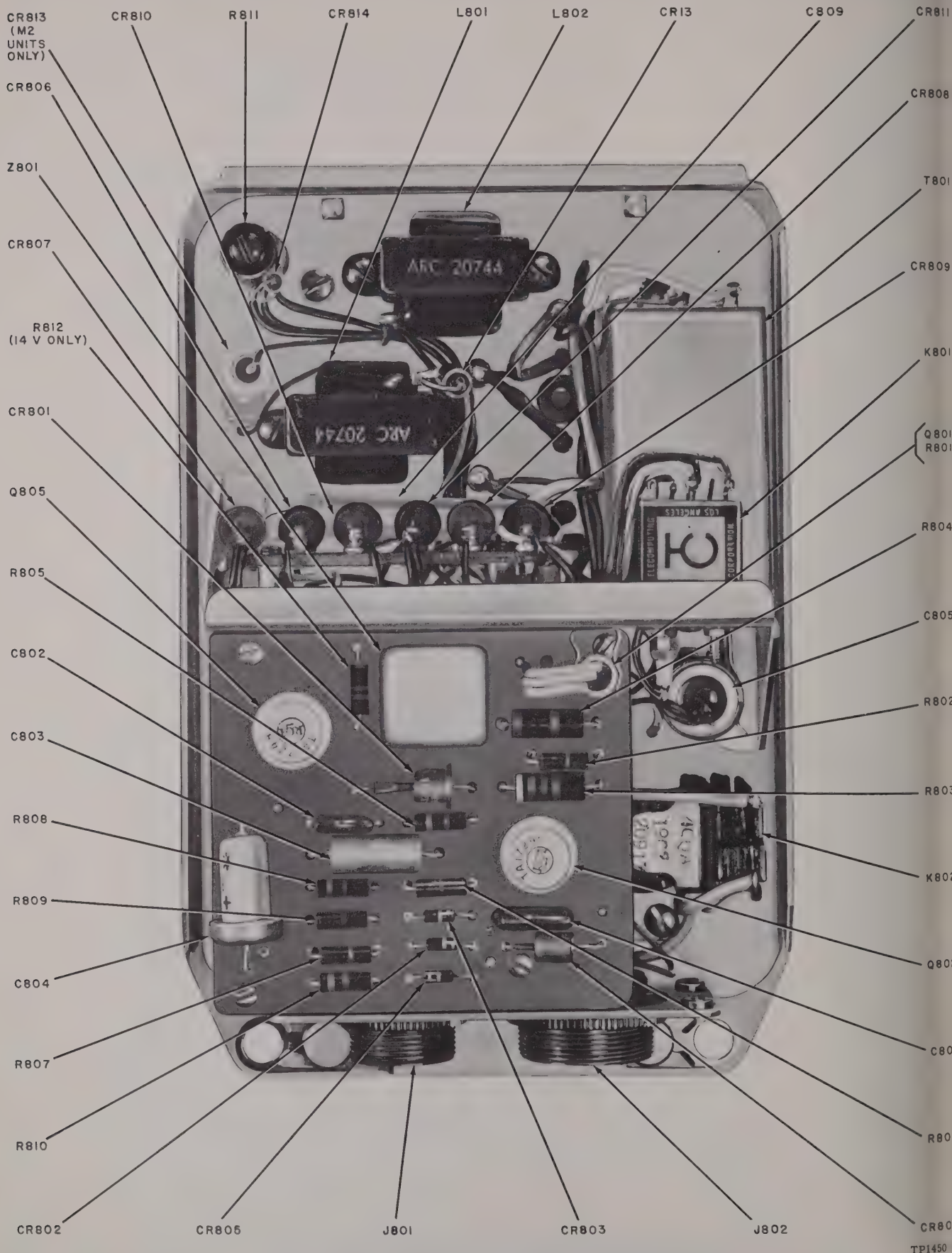

Figure 6. DV-15A Dynaverter, Top Interior View

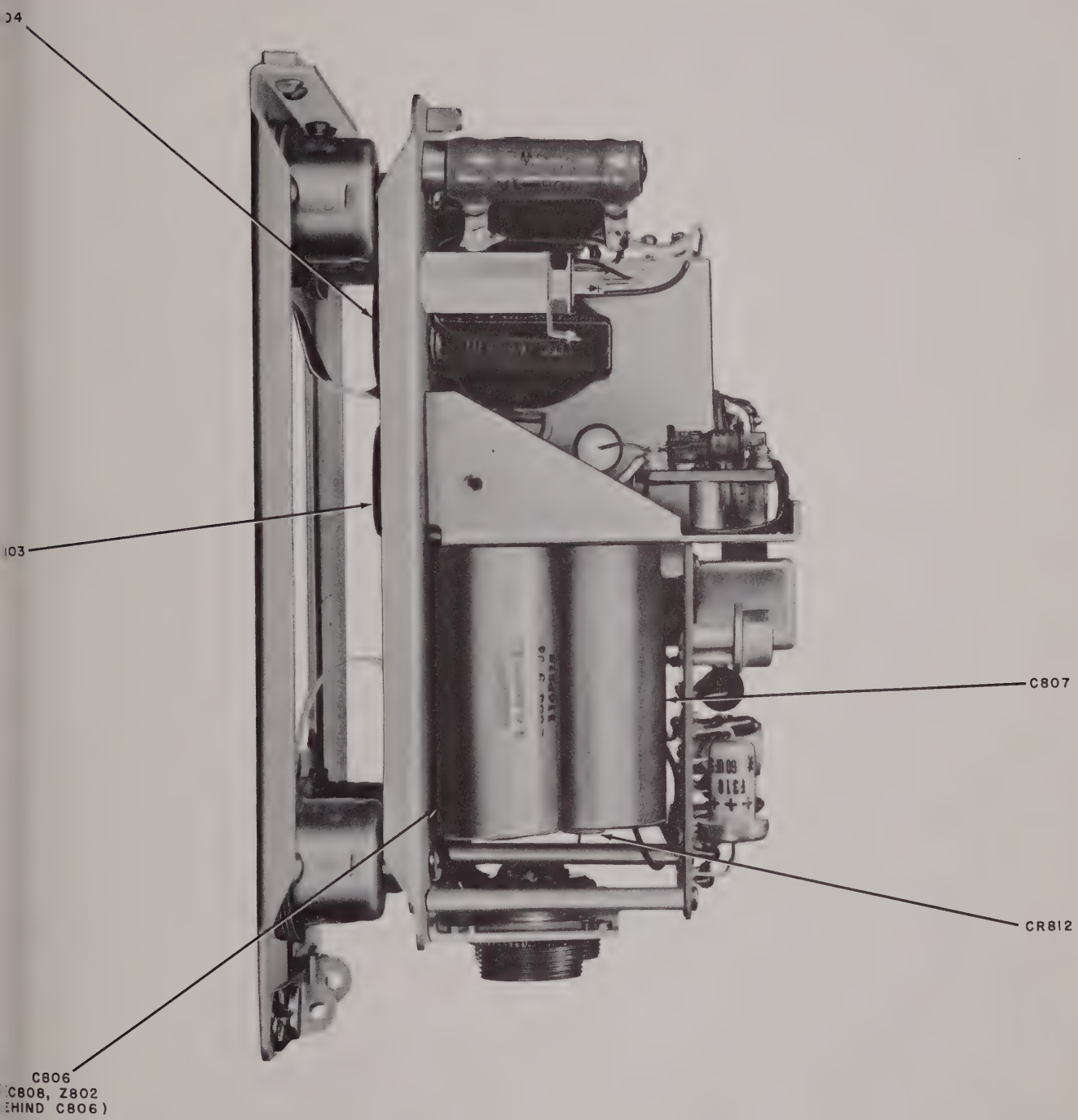

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Figure 7. DV-15A Dynaverter, Left Interior View

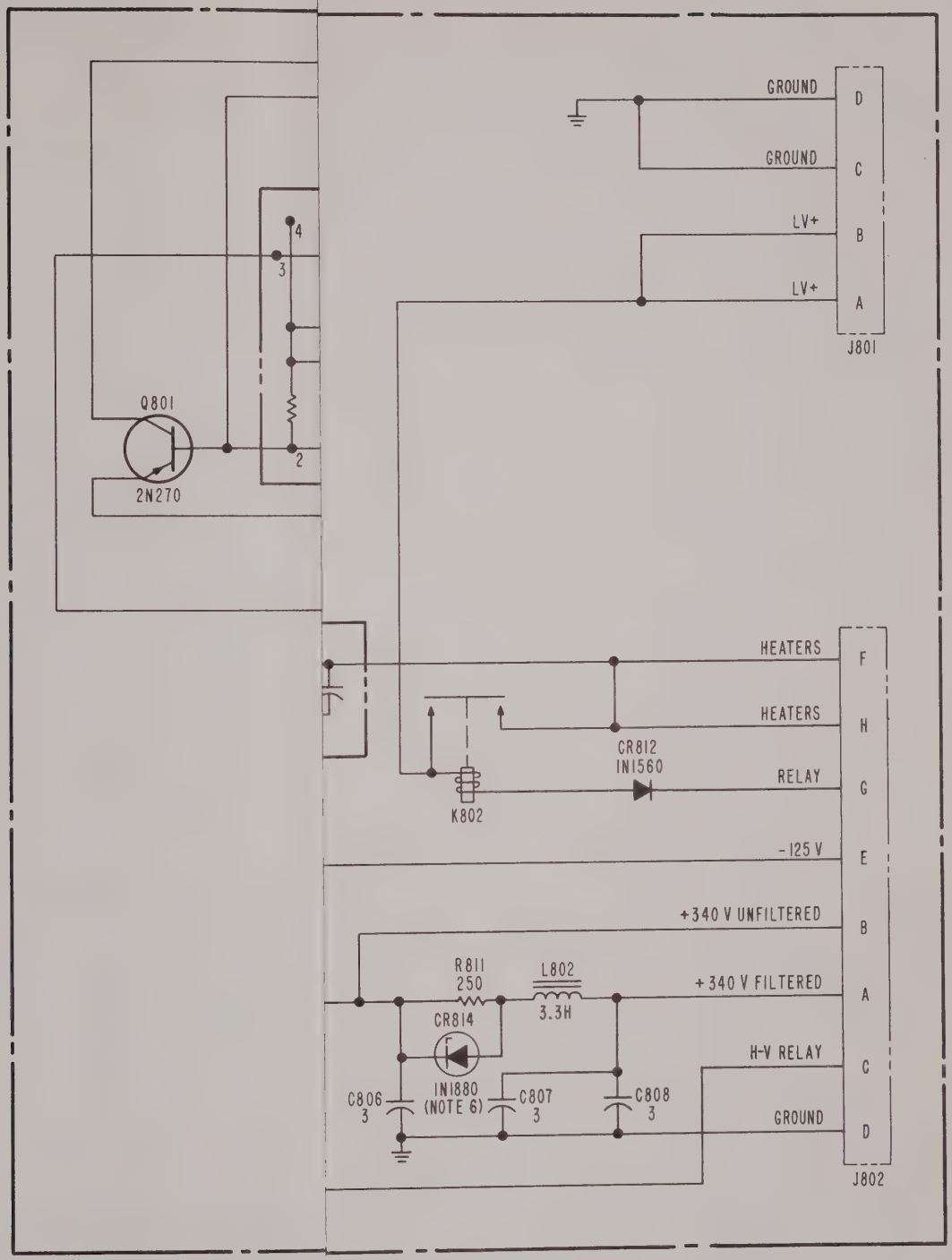

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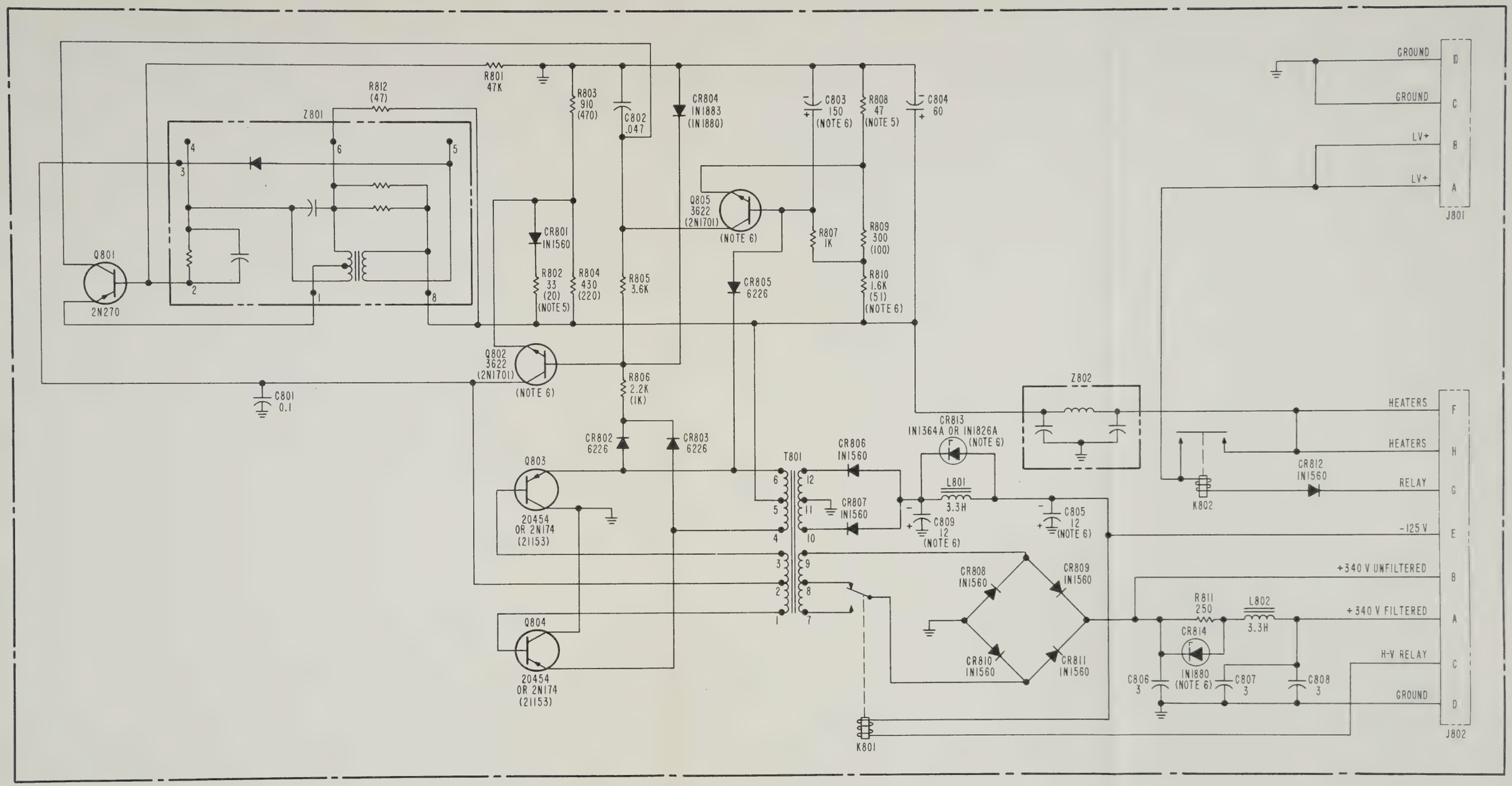
Figure 8. DV-15A Dynaverter, Schematic Diagram



NOTES:

1. FOR WIRING DIAGRAM, SEE FIGURE 9.
2. RESISTANCE VALUES ARE IN OHMS; MULTIPLIER K = 1000.
3. CAPACITANCE VALUES ARE IN MICROFARADS (μF).
4. VALUES AND TYPES IN PARENTHESES ARE FOR 14-VOLT MODELS ONLY.
5. VALUE SELECTED AND INSTALLED DURING FINAL FACTORY ADJUSTMENT; NOMINAL VALUE IS SHOWN.
6. A. IN SOME ORIGINAL UNITS C803 WAS 47 $\mu\mu$F, R810 WAS 820 OHMS (14-VOLT ONLY), C809 AND CR814 WERE NOT INCLUDED, AND Q802 AND Q805 WERE TYPE TA1724.

   B. IN ORIGINAL UNITS C805 WAS 3 μF, C809 WAS 0.1 μF, AND CR813 WAS TYPE 1N1880.

   C. IN M1 UNITS CR813 WAS TYPE 1N1883.

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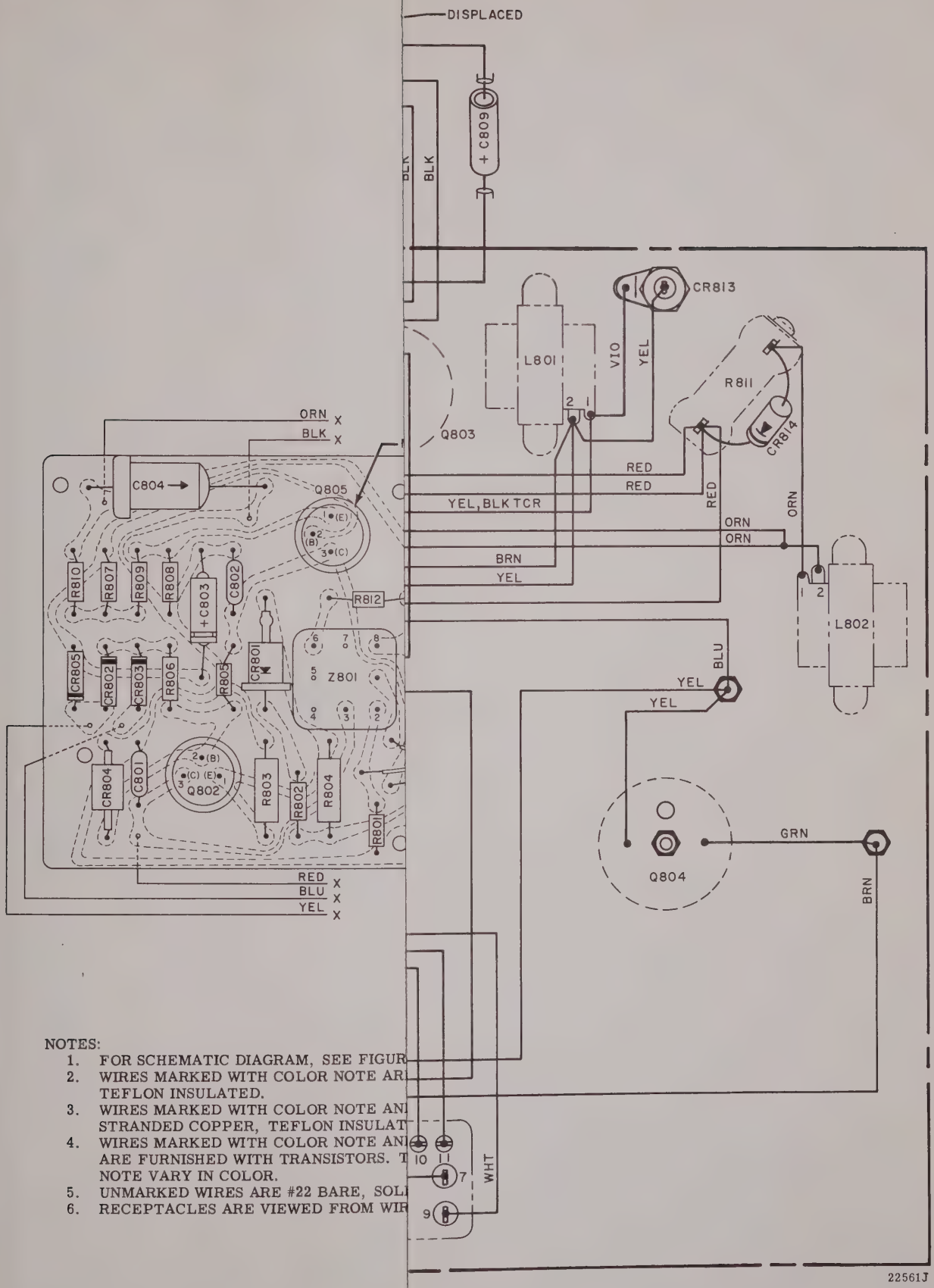
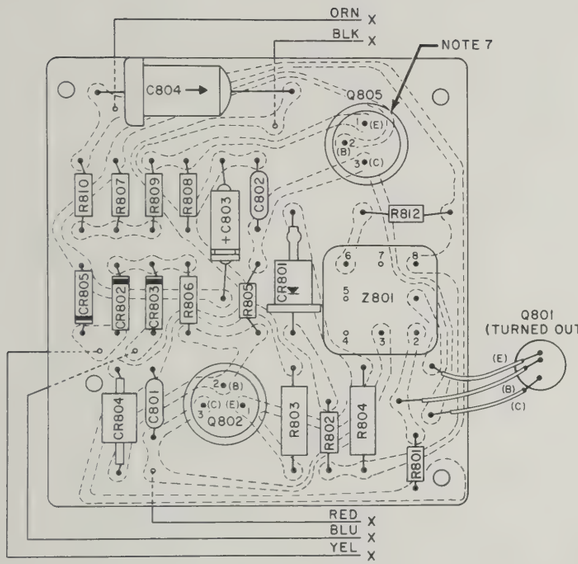
Figure 8. DV-15A Dynaverter, Schematic Diagram

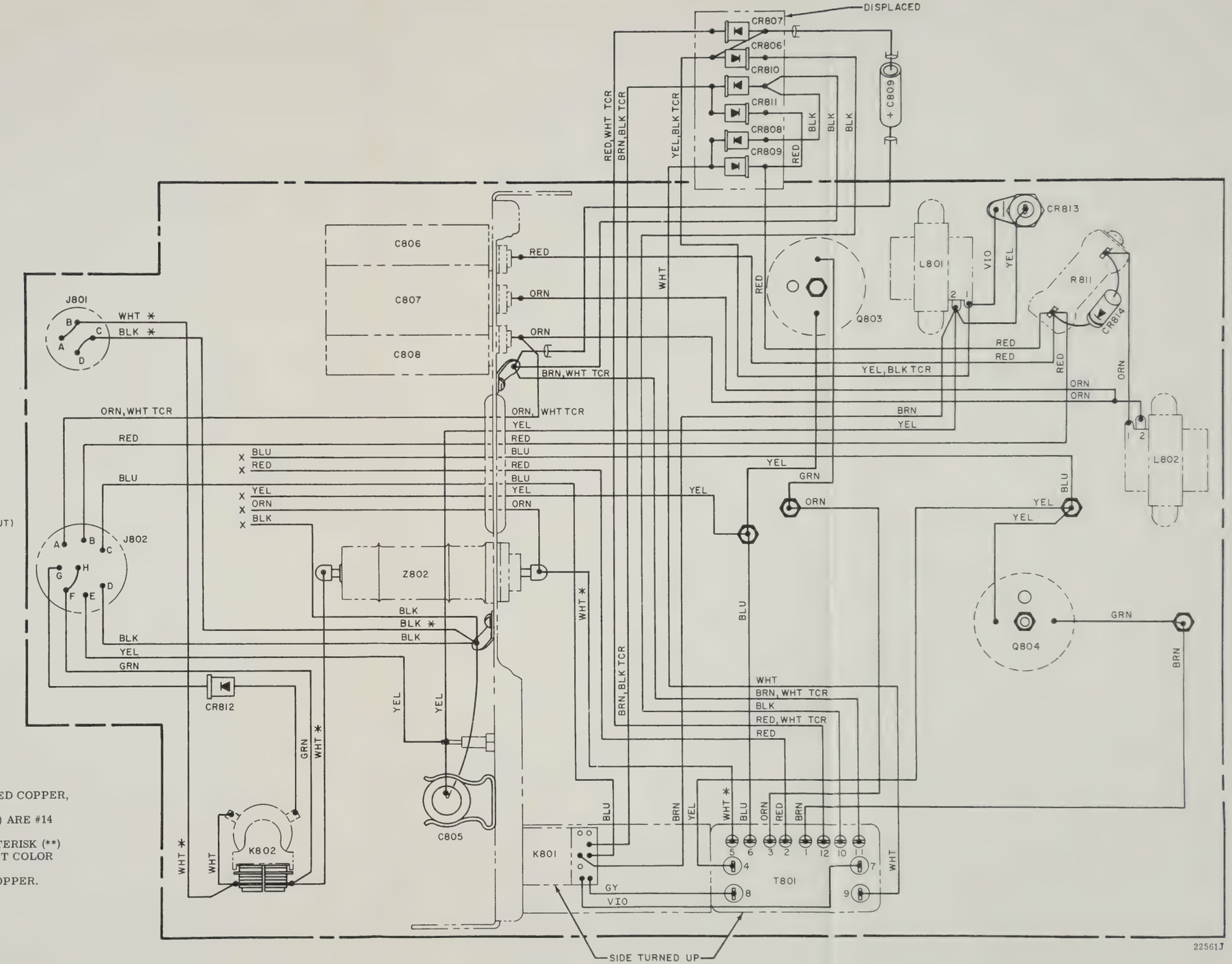


NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGUR
2. WIRES MARKED WITH COLOR NOTE AR TEFLON INSULATED.
3. WIRES MARKED WITH COLOR NOTE AN STRANDED COPPER, TEFLON INSULAT
4. WIRES MARKED WITH COLOR NOTE AN ARE FURNISHED WITH TRANSISTORS. T NOTE VARY IN COLOR.
5. UNMARKED WIRES ARE #22 BARE, SOL
6. RECEPTACLES ARE VIEWED FROM WIR

Figure 9. DV-15A Dynaverter, Wiring Diagram





NOTES:
1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 8.
2. WIRES MARKED WITH COLOR NOTE ARE #22 STRANDED COPPER, TEFLON INSULATED.
3. WIRES MARKED WITH COLOR NOTE AND ASTERISK (*) ARE #14 STRANDED COPPER, TEFLON INSULATED.
4. WIRES MARKED WITH COLOR NOTE AND DOUBLE ASTERISK (**) ARE FURNISHED WITH TRANSISTORS. THOSE WITHOUT COLOR NOTE VARY IN COLOR.
5. UNMARKED WIRES ARE #22 BARE, SOLID, TINNED COPPER.
6. RECEPTACLES ARE VIEWED FROM WIRED SIDE.

Figure 9. DV-15A Dynaverter, Wiring Diagram

1 Cover
2 Screw
3 Printed Circuit
4 Screw
5 Washer
6 Transistor
7 Resistor
8 Oscillator
9 Transistor
10 Resistor
11 Resistor
12 Resistor
13 Resistor
14 Diode
15 Resistor
16 Capacitor
17 Capacitor
18 Resistor
19 Capacitor
20 Diode
21 Diode
22 Capacitor
23 Resistor
24 Resistor
25 Resistor
26 Resistor
27 Printed Circuit
28 Base
29 Screw
30 Washer
31 Strap
32 Screw
33 Nut
34 Base
35 Post
36 Screw
37 Capacitor
38 Nut
39 Washer
40 Connector
41 Nut
42 Diode
43 Filter
44 Nut
45 Washer
46 Connector
47 Nut
48 Relay
49 Screw
50 Capacitor
51 Relay
52 Nut
52A Insulator
53 Washer
54 Transformer
55 Screw
56 Nut
57 Reactor
58 Screw
58A Capacitor
59 Diode
60 Panel
61 Screw
62 Washer
63 Transistor
64 Nut
65 Washer
66 Diode
66A Diode
66B Diode
66C Terminal
66D Washer
66E Post
66F Screw
67 Resistor
68 Screw
69 Washer
70 Chassis
71 Insulator
72 Screw
73 Grommet
74 Terminal
75 Screw
76 Nut
77 Washer
78 Chassis

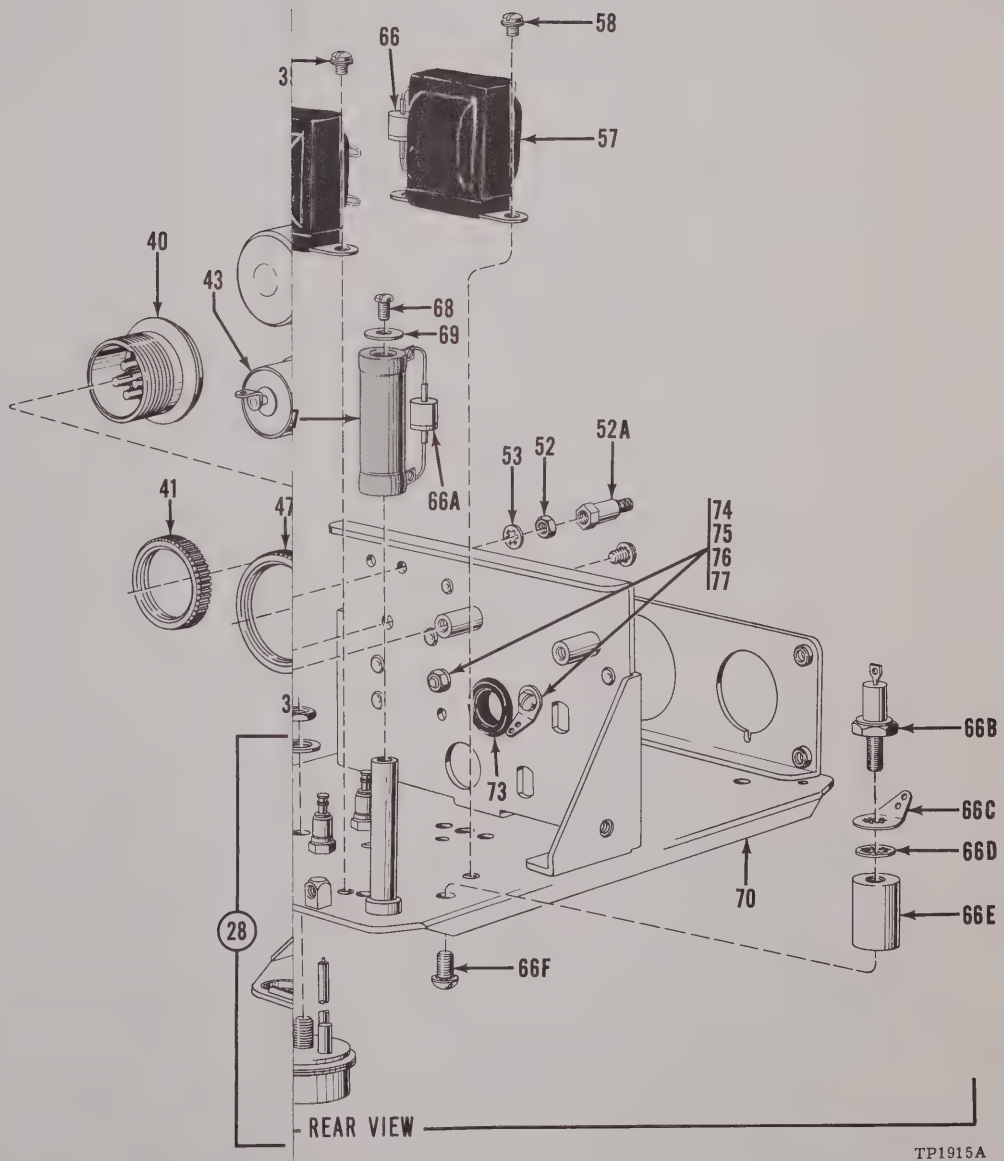


Figure 10. DV-15A Dynaverter, Exploded View

1	Cover
2	Screw
3	Printed Circuit
4	Screw
5	Washer
6	Transistor
7	Resistor
8	Oscillator
9	Transistor
10	Resistor
11	Resistor
12	Resistor
13	Resistor
14	Diode
15	Resistor
16	Capacitor
17	Capacitor
18	Resistor
19	Capacitor
20	Diode
21	Diode
22	Capacitor
23	Resistor
24	Resistor
25	Resistor
26	Resistor
27	Printed Circuit
28	Base
29	Screw
30	Washer
31	Strap
32	Screw
33	Nut
34	Base
35	Post
36	Screw
37	Capacitor
38	Nut
39	Washer
40	Connector
41	Nut
42	Diode
43	Filter
44	Nut
45	Washer
46	Connector
47	Nut
48	Relay
49	Screw
50	Capacitor
51	Relay
52	Nut
52A	Insulator
53	Washer
54	Transformer
55	Screw
56	Nut
57	Reactor
58	Screw
58A	Capacitor
59	Diode
60	Panel
61	Screw
62	Washer
63	Transistor
64	Nut
65	Washer
66	Diode
66A	Diode
66B	Diode
66C	Terminal
66D	Washer
66E	Post
66F	Screw
67	Resistor
68	Screw
69	Washer
70	Chassis
71	Insulator
72	Screw
73	Grommet
74	Terminal
75	Screw
76	Nut
77	Washer
78	Chassis

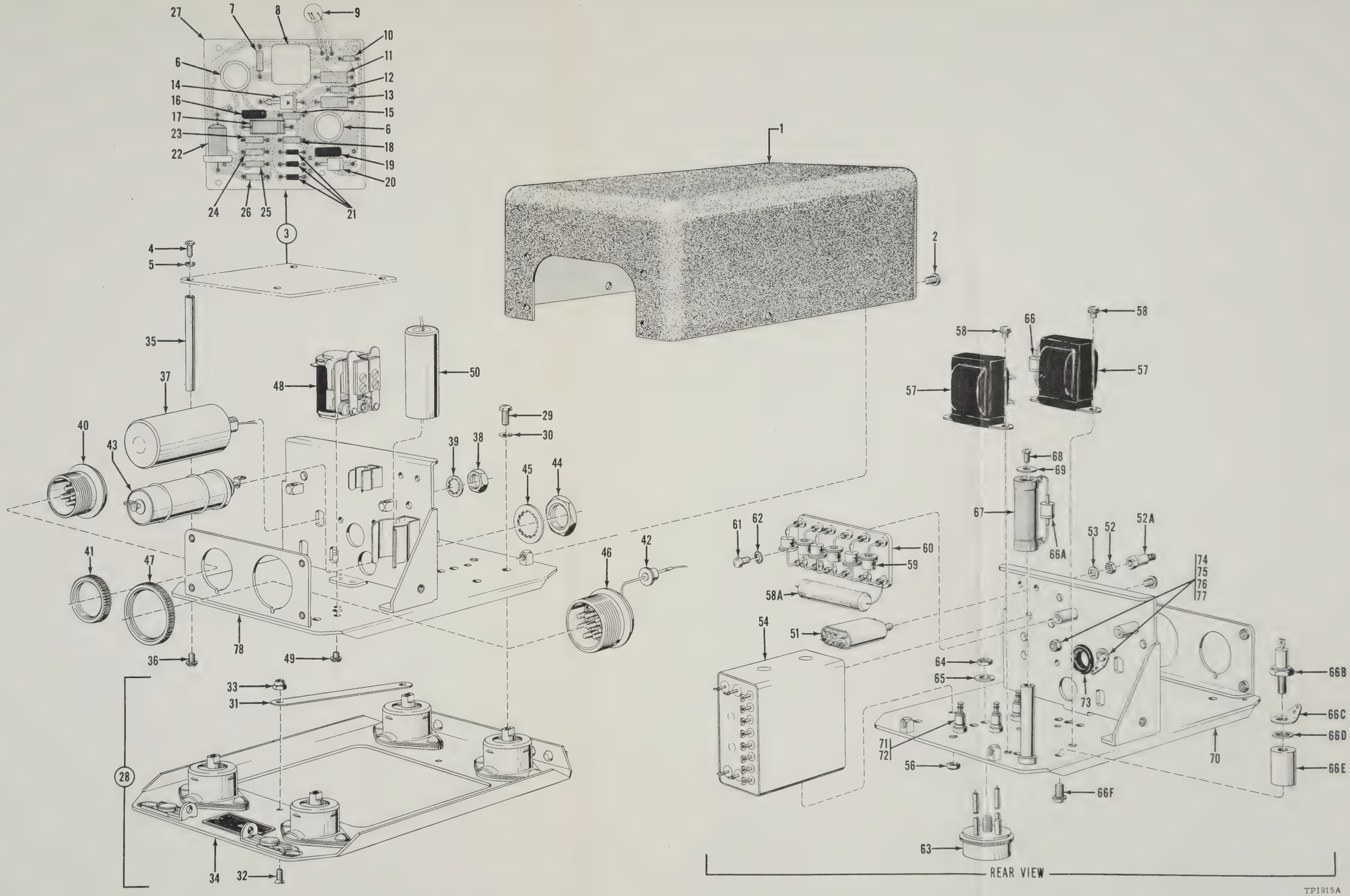


Figure 10. DV-15A Dynaverter, Exploded View

PARTS CATALOG

FOR

CESSNA TRANSCEIVER 800

CESSNA AIRCRAFT COMPANY

WICHITA, KANSAS

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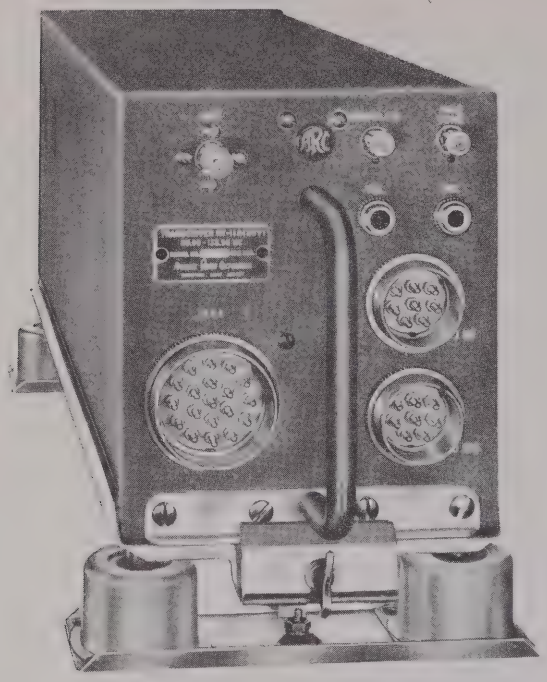
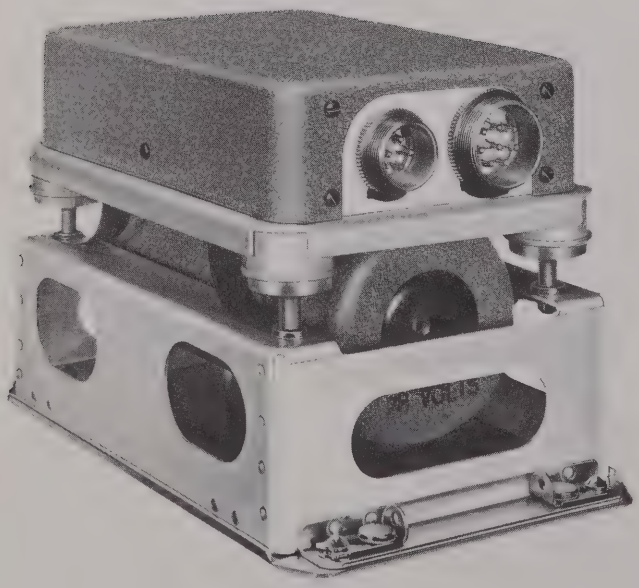
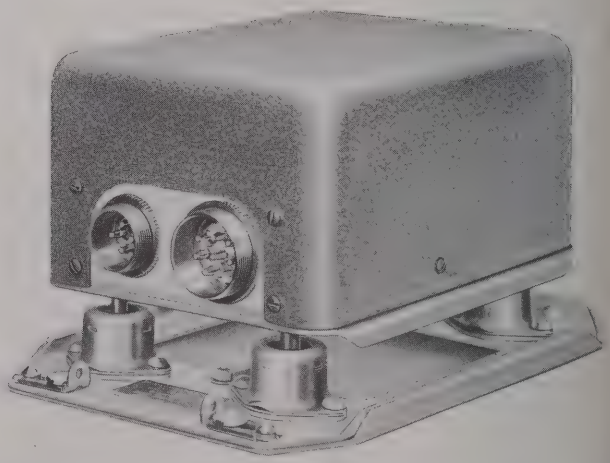


RT-11A RECEIVER TRANSMITTER
WITH
M-31A MOUNTING

C-67A CONTROL UNIT



P-15A POWER UNIT
WITH
M-32A MOUNTING



DV-15A DYNAVERTER
WITH
M-33A MOUNTING

TP1630

Figure 1. Type 210 VHF Communication Equipment, Major Units

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

This book contains parts information for the ARC Type 210 VHF Communication Equipment (Figure 1) manufactured by Aircraft Radio Corporation, Boonton, New Jersey.

1-2. PARTS LIST.

The Parts List, Section II, consists of a breakdown of the equipment into assemblies, subassemblies, and detail parts. Items which are made from bulk stock, such as cut lengths of wire, are not included.

The description column lists each assembly, or subassembly, and its detail parts properly indented to show their relationship to the assembly or subassembly. Attaching parts are listed in the same indented column, following the parts they attach. The symbol "- - - * - - -" indicates the completion of the attaching parts. A reference to a figure and index number in the description column refers to a separate illustration and listing in which the detail parts are shown, or to the illustration on which the part is shown as an assembled item. Parts which are limited in use to a specific model or serial number group are identified by noting the applicable model or serial numbers. Codes and part numbers of manufacturers (paragraph 1-5) other than ARC are also included in parentheses in the description column.

Except for attaching parts, the quantities listed in the units-per-assembly column are the quantities per assembly, per subassembly, etc. The quantities specified, therefore, are not necessarily the total for the equipment; total quantities are listed in the Numerical Index, Section III. The letters "AR" denote that the quantity used is "as required." "Ref" indicates an assembly which was removed previously and which is relisted for reference purposes.

1-3. NUMERICAL INDEX.

The part number column of the Numerical Index, Section III, lists all part numbers included in the Parts List, cross-referenced to the figure and index numbers. Parts which have neither an ARC nor a manufacturer's part number are listed alphabetically by item name at the beginning of the column. Where the part number refers to an assembly or subassembly which is not shown assembled on the illustration, no index number is assigned, and therefore only the figure number, on which the detail parts are shown, is listed in parentheses.

The numerical index is compiled in accordance with the following alphabetical-numerical system. Part number arrangement starts at the left and continues from left to right, one column at a time, until part number position in the numerical index is determined. Beginning with the first column, the order of precedence to determine the part number position is as follows:

1. Letters A through Z
2. Numerals 0 through 9

Continuing with the second and succeeding column, the order of precedence to determine the part number is as follows:

1. Space (blank column)
2. Diagonal (slant) /
3. Point (period) .
4. Dash (—)
5. Parentheses ( )
6. Letters A through Z
7. Numerals 0 through 9

Alphabetical O's are considered as numerical zeros.

The total quantity column lists the total quantity of assemblies or parts for the equipment. The letters "AR" indicate that the quantities used are indeterminate (as required) and no definite quantity can be shown.

1-4. REFERENCE DESIGNATION INDEX.

The Reference Designation Index, Section IV, lists the reference designations which have been assigned to the parts of the equipment, cross-referenced to the figure and index numbers and the part number. Where no figure and index number exists for a part, the figure and index number of the next higher assembly is listed in parentheses. The reference designation column lists the reference designations in alphabetical-numerical sequence. All reference designations used in illustrations and publications pertaining to the equipment are listed.

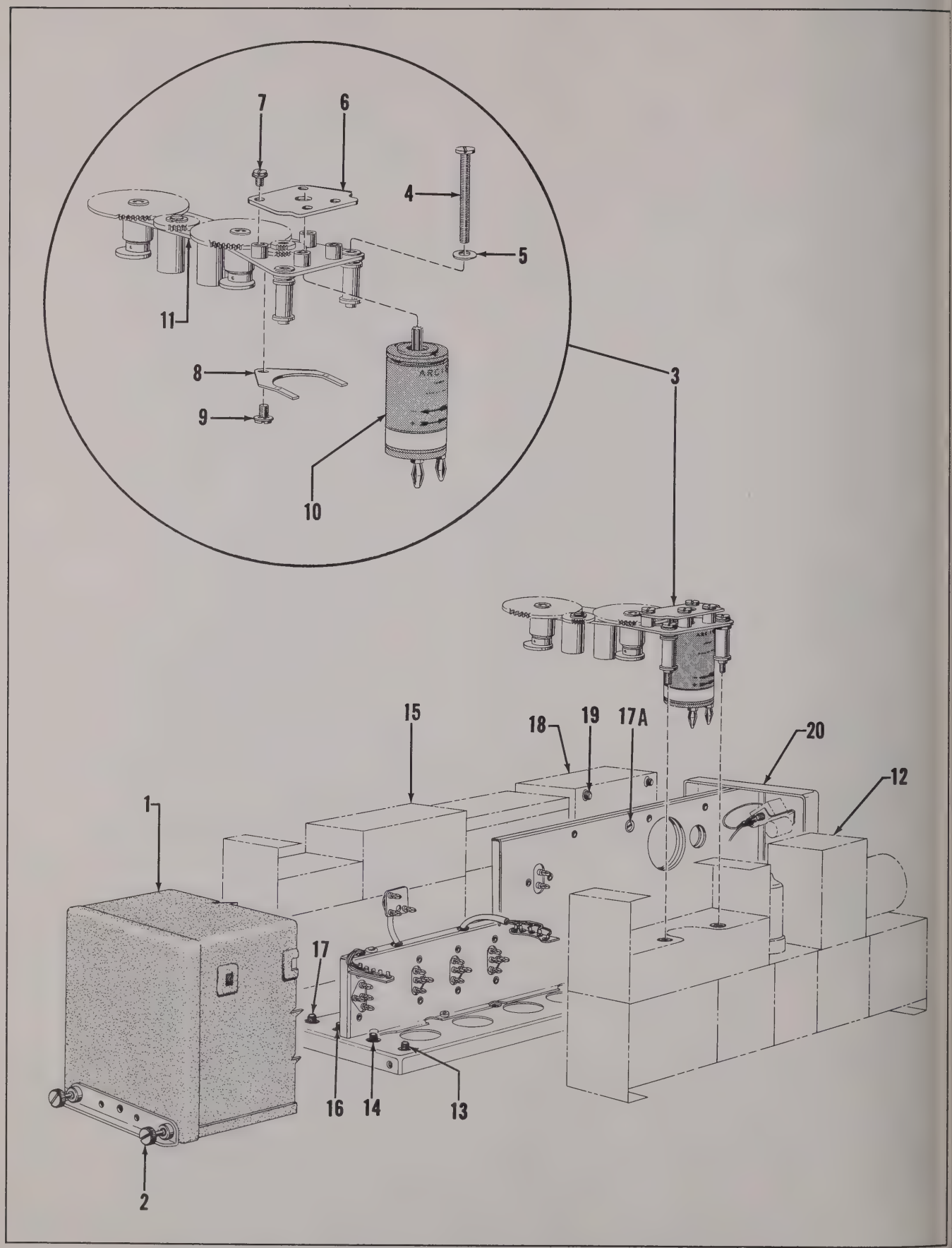
1-5. MANUFACTURERS' CODES.

The following is a list of manufacturers' codes, and the corresponding names and addresses, which are referenced in this Parts Catalog.

Code	Name and Address
AB	Allen-Bradley Co. Milwaukee, Wisconsin
AEV	Aerovox Corp. New Bedford, Massachusetts
AMP	Amphenol-Borg Electronics Corp. Chicago 50, Illinois
CE	Continental Electric Co. Newark, New Jersey
CIN	Cinch Manufacturing Corp. Chicago, Illinois
CGT	Cambridge Thermionic Corp. Cambridge, Massachusetts
CLD	Cornell-Dubilier Electric Corp. South Plainfield, New Jersey
CLP	Clifton Precision Products Co., Inc. Clifton Heights, Pennsylvania
CMPB	Colin Campbell Co., Inc. Danbury, Connecticut
CN	Centralab Div. Globe Union, Inc. Milwaukee, Wisconsin
DABU	Dale Products, Inc. Columbus, Nebraska
DECN	Delevan Electronics Corp. East Aurora, New York
DELCO	Delco Radio Division of General Motors Corp. Kokomo, Indiana
EBY	Hugh H. Eby, Inc. Philadelphia, Pennsylvania
EMM	Electro Motive Mfg. Co. Willimantic, Connecticut
ERC	Erie Resistor Corp. Erie, Pennsylvania
ESNA	Elastic Stop Nut Corp. of America Union, New Jersey
FML	Fansteel Metallurgical Corp. North Chicago, Illinois
GAEM	Good-All Electric Mfg. Co. Ogallala, Nebraska
GBR	Globar Div. Carborundum Co. Niagara Falls, New York
GE	General Electric Co. Schenectady, New York
GOS	Goshen Rubber Co., Inc. Goshen, Indiana
GVP	Groov-Pin Corp. Ridgefield, New Jersey
HUG	Hughes Aircraft Co. Culver City, California
IPC	Industrial Products Co., Div. Knudsen, Inc. Danbury, Connecticut
JFDM	J. F. D. Electronics Corp. Brooklyn, New York
JFE	Jeffers Electronics Corp. Dubois, Pennsylvania
KER	Kearfott Mfg. Corp. Newark, New Jersey
KO	Kollsman Instrument Corp. Elmhurst, New York
LCL	L. L. Constantin & Co. Lodi, New Jersey
MCS	Micro Switch Div. Minneapolis-Honeywell Regulator Co. Freeport, Illinois
MICRODOT	Microdot, Inc. South Pasadena, California
ND	New Departure Div. General Motors Corp. Bristol, Connecticut
NHBB	New Hampshire Ball Bearing, Inc. Peterborough, New Hampshire
PCR	Phillips Control Corp. Joliet, Illinois
PK	Parker-Kalon Corp. New York, New York
RESP	Resistance Products Co. Harrisburg, Pennsylvania
SH	Shakeproof, Inc. Div. Illinois Tool Works Chicago, Illinois
SLM	Solar Manufacturing Corp. New York, New York
SPR	Sprague Electric Co. North Adams, Massachusetts
STL	Stackpole Carbon Co. St. Mary's, Pennsylvania
TI	Texas Instruments, Inc. Components Div. Dallas, Texas
VEL	The Vellumoid Co. Worcester, Massachusetts
WKI	Waldes-Koh-I-Noor, Inc. Long Island City, New York
WS	Weston Electrical Instrument Corp. Newark, New Jersey

SECTION II

PARTS LIST



TP1601

Figure 2. Type RT-11A Receiver-Transmitter Assembly

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
2-	19300(14V)	RECEIVER-TRANSMITTER ASSEMBLY, ARC Type RT-11A (14V). .	1
2-	19300(28V)	RECEIVER-TRANSMITTER ASSEMBLY, ARC Type RT-11A (28V). .	1
-1	19480	. CABINET ASSEMBLY	1
		(ATTACHING PARTS)	
-2	13996	. SCREW, Externally relieved body, No. 10-32 thd	2
		- - - * - - -	
-3	19544(14V)	. GEARING SUBASSEMBLY (14V)	1
-3	19544(28V)	. GEARING SUBASSEMBLY (28V)	1
		(ATTACHING PARTS)	
-4	104(1-1/8)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 1-1/8 in. lg. .	2
-5	7730	. WASHER, Spring tension	2
		- - - * - - -	
-6	19543	. . PLATE	1
		(ATTACHING PARTS)	
-7	502(3/16)	. . SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 2-56 thd by 3/16 in. lg (SH)(SEMS)	4
		- - - * - - -	
-8	19542	. . SPRING	1
		(ATTACHING PARTS)	
-9	503(5/32)	. . SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 3-48 thd by 5/32 in. lg (SH)(SEMS)	1
		- - - * - - -	
-10	18800	. . MOTOR, DC, 14V (CLP)(DC-8-C-51)	1
-10	18801	. . MOTOR, DC, 28V (CLP)(DC-8-C-11)	1
-11	—	. . GEAR ASSEMBLY, c/o gear 19498, gear 19540, gear 19537, . and plate 19493	1
-12	19370(14V)	. TRANSMITTER ASSEMBLY (14V)(see Figure 3).	1
-12	19370(28V)	. TRANSMITTER ASSEMBLY (28V)(see Figure 3).	1
		(ATTACHING PARTS)	
-13	106(7/32)	. SCREW, Machine, bind hd, brs, ni pl, 6-32 thd by 7/32 in. lg . .	1
-14	106(9/32)	. SCREW, Machine, bind hd, brs, ni pl, 6-32 thd by 9/32 in. lg . .	4
		- - - * - - -	
-15	20420(14V)	. RECEIVER ASSEMBLY (14V)(see Figure 4).	1
-15	20420(28V)	. RECEIVER ASSEMBLY (28V)(see Figure 4).	1
		(ATTACHING PARTS)	
-16	106(7/32)	. SCREW, Machine, bind hd, brs, ni pl, 6-32 thd by 7/32 in. lg . .	1
-17	106(9/32)	. SCREW, Machine, bind hd, brs, ni pl, 6-32 thd by 9/32 in. lg . .	3
-17A	106(5/16)	. SCREW, Machine, bind hd, brs, ni pl, 6-32 thd by 5/16 in. lg . .	1
		- - - * - - -	
-18	20360	. MODULATOR ASSEMBLY (see Figure 5)	1
		(ATTACHING PARTS)	
-19	106(9/32)	. SCREW, Machine, bind hd, brs, ni pl, 6-32 thd by 9/32 in. lg . .	2
		- - - * - - -	
-20	19302(14V)	. CHASSIS ASSEMBLY (14V)(see Figure 6)	1
-20	19302(28V)	. CHASSIS ASSEMBLY (28V)(see Figure 6)	1

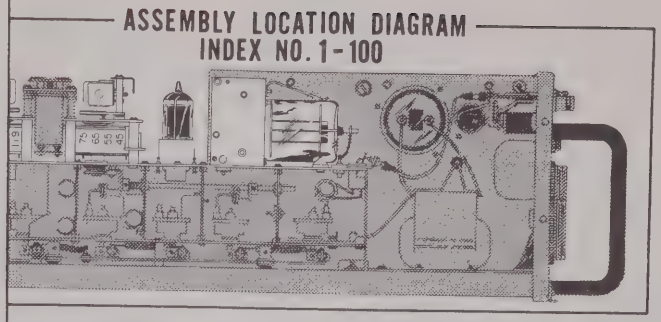
Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
3-	19370(14V)	TRANSMITTER ASSEMBLY (14V)(see 12, Figure 2).	Ref
3-	19370(28V)	TRANSMITTER ASSEMBLY (28V)(see 12, Figure 2).	Ref
-1	20806	. FILTER ASSEMBLY.	1
		(ATTACHING PARTS)	
-2	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-3	19323	. . JACK, Tip (Microdot)(3223)	1
-4	700-143	. ELECTRON TUBE, Type 6850	1
-5	19628	. SPRING, Leaf	1
		(ATTACHING PARTS)	
-6	8040	. NUT, Hexagon, brs, ni pl, 4-40 thd by 0.062 in. thk	1
		- - - * - - -	
-7	19653	. PLATE, Cover	1
		(ATTACHING PARTS)	
-8	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
		- - - * - - -	
	19611	. SOCKET ASSEMBLY	1
		(ATTACHING PARTS)	
-9	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
		- - - * - - -	
-10	203(150)	. . RESISTOR, Fixed, comp, 150 ohms ±5 per cent, 2w (AB) . . (HB1515)	1
-11	8877(1.0)	. . CHOKE, 1.0 μh ±20 per cent (JFE)(10100-630)	1
-12	202(15K)	. . RESISTOR, Fixed, comp, 15,000 ohms ±5 per cent, 1w (AB). (GB1535)	1
-12A	202(22K)	. . RESISTOR, Fixed, comp, 22,000 ohms ±5 per cent, 1w (AB). (GB2235)	1
-13	8796(120)	. . CAPACITOR, Fixed, ceramic, 120 μμf ±5 per cent, ... 500 vdcw	5
-14	201(22K)	. . RESISTOR, Fixed, comp, 22,000 ohms ±5 per cent, 1/2w . . (AB)(EB2235)	2
-15	14141(3)	. . CHOKE, 3 μh ±10 per cent (JFE)(10100-652)	2
-16	201(1K)	. . RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, 1/2w . . . (AB)(EB1025)	1
-17	19655	. BRACKET ASSEMBLY.	1
		(ATTACHING PARTS)	
-18	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
		- - - * - - -	
-19	10284	. TERMINAL ASSEMBLY	1
		(ATTACHING PARTS)	
-20	103(1/4)	. SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg .	1
-21	17166	. TERMINAL, Lug	1
-22	4103	. WASHER, Lock, sst, 0.105 ID by 0.220 OD by 0.016 in. thk . . (SH)(1703)	2
		- - - * - - -	
-23	700-121	. ELECTRON TUBE, Type 5686	1
-24	15230	. SOCKET, Electron tube (CIN)(53F13381).	1
		(ATTACHING PARTS)	
-25	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
-26	4103	. WASHER, Lock, sst, No. 3, 0.105 ID by 0.220 OD by . . . . . 0.016 in. thk (SH)(1703)	2
-27	10283	. INSERT, Screw thread	2
		- - - * - - -	
-28	201(220)	. RESISTOR, Fixed, comp, 220 ohms ±5 per cent, 1/2w . . . . (AB)(EB2215)	1
	19660(14V)	. TUNER ASSEMBLY, 14V.	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
	19660(28V)	. TUNER ASSEMBLY, 28V	1
		(ATTACHING PARTS)	
3-29	504(1-5/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 1-5/16 in. lg (SH)(SEMS)	4
-30	19647	. POST, Threaded	1
-31	7730	. WASHER, Spring tension	1
		- - - * - - -	
-32	20733	. . CONTACT SHIELD	2
		(ATTACHING PARTS)	
-33	503(5/32)	. . SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 5/32 in. lg (SH)(SEMS)	4
		- - - * - - -	
-34	19664	. . RELAY, Armature (14V)	2
-34	19665	. . RELAY, Armature (28V)	2
		(ATTACHING PARTS)	
-35	503(5/16)	. . SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 5/16 in. lg (SH)(SEMS)	4
		- - - * - - -	
-35A	17633	. . SEMICONDUCTOR DEVICE, Diode, type 1N462. (used beginning with M-6 units)	2
-35B	201(15)	. . RESISTOR, Fixed, comp, 15 ohms ±5 per cent, 1/2w (AB)(EB1505)(used in 28v models only)	1
-35C	8625(0.001)	. . CAPACITOR, Fixed, ceramic, 0.001 μf +100 -0 per cent, 500 vdcw (used in units beginning with M-9)	1
-36	314(1/4)	. . SETSCREW, Fluted socket dr, cone point, sst, 4-40 thd. by 1/4 in. lg	8
-37	19571	. . PAWL (Right hand)	1
-38	19568	. . PAWL (Left hand)	1
		(ATTACHING PARTS)	
-39	17742	. . RING, Retaining (WKI)(5100-18-C)	2
-40	17765	. . WASHER, Flat	AR
		- - - * - - -	
-41	19566	. . SPRING, Helical, torsion	2
-42	19569	. . SPRING, Helical, extension	1
-43	21504	. . SPRING, Helical, extension	2
	19674	. . LEVER ASSEMBLY (Right hand)	1
	19668	. . LEVER ASSEMBLY (Left hand)	1
		(ATTACHING PARTS)	
-44	17326	. . RING, Retaining (WKI)(5133-12-C-MF)	2
-45	17768	. . WASHER, Flat	AR
		- - - * - - -	
-46	19568	. . . PAWL (Right hand)	1
-47	19571	. . . PAWL (Left hand)	1
		(ATTACHING PARTS)	
-48	103(1/4)	. . . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg.	2
-49	5727	. . . WASHER, Spring tension	2
-50	19574	. . . WASHER, Shouldered	2
-51	17742	. . . RING, Retaining (WKI)(5100-18-C)	2
-52	19551	. . . POST, Threaded	2
		- - - * - - -	
-53	19570	. . . SPRING, Helical, torsion	2
-53A[1]	—	. . . LEVER, Right hand	1
-53B[1]	—	. . . LEVER, Left hand	1
-54	19442	. . SPRING, Helical, extension	4
-55	15181	. . NUT, Round	2
-56	16088	. . WASHER, Flat	6
-57	19572	. . PLATE, Indexing	2
-58	19447	. . RATCHET ASSEMBLY (Right hand)	1
-59	19446	. . RATCHET ASSEMBLY (Left hand).	1
-60	19573	. . BUSHING	2

[1]Nonprocurable part.

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
3-61	20624	. . BEARING, Ball (ND)(SSRS77NR4HGZD-1228E)	2
		(ATTACHING PARTS)	
-62	20622	. . WASHER, Flat	2
-63	20623	. . RING, Retaining (WKI)(5101-62-W)	2
		- - - * - - -	
-64	19443	. . PLATE.	2
-65	19478	. . STUD, Threaded	2
-66	19669	. . PLATE.	1
		(ATTACHING PARTS)	
-67	503(5/16)	. . SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 5/16 in. lg (SH)(SEMS)	3
		- - - * - - -	
-68	19374	. . POST	4
-69	19336	. . PLATE, Contact	2
-70	19661	. . PANEL.	1
-71	19623	. DIAL.	1
-72	19624	. DIAL.	1
-73	19650	. SPRING, Tension	2
		(ATTACHING PARTS)	
-74	503(3/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 3/16 in. lg (SH)(SEMS)	8
		- - - * - - -	
-74A	26298	. INSULATOR	1
-75	19657(*)[1]	. CRYSTAL UNIT, Quartz	20
-76	19658(*)[1]	. CRYSTAL UNIT, Quartz	18
-77	19473	. GEAR-CAM SUBASSEMBLY	1
		(ATTACHING PARTS)	
-78	20625	. RING, Retaining (WKI)(5101-56-W)	1
-79	21322	. WASHER, Flat	1
		- - - * - - -	
-80	21373	. PLATE SUBASSEMBLY	1
		(ATTACHING PARTS)	
-81	336(1/8)	. SETSCREW, Fluted socket dr, flat point, sst, 6-32 thd by 1/8 in. lg	1
-82	10274	. DISC	1
		- - - * - - -	
	19372	. PLATE SUBASSEMBLY	1
		(ATTACHING PARTS)	
-83	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	8
-84	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-85	20620	. . BEARING, Ball (ND)(SSRS77NR3HGZD1228E)	1
		(ATTACHING PARTS)	
-86	20625	. . RING, Retaining (WKI)(5101-56-W)	1
-87	20621	. . WASHER, Flat, al aly, 0.565 ID by 0.781 OD by 0.032 in. thk	1
		- - - * - - -	
-88	8796(120)	. . CAPACITOR, Fixed, ceramic, 120 $\mu\mu$f ±5 per cent, 500 vdcw	1
-89	8877(0.68)	. . CHOKE, RF, 0.68 μh ±20 per cent (JFE)(10100-628)	1
-90	21303	. . TERMINAL BLOCK	1
		(ATTACHING PARTS)	
-91	103(1/2)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/2 in. lg	2
-92	4561	. . NUT, Hexagon, brs, ni pl, 3-48 thd by 0.062 in. thk	2
-93	13473	. . WASHER, Spring tension.	2
		- - - * - - -	
-94	19380	. . TERMINAL BLOCK	1

[1]Insert crystal frequency in megacycles in place of (*) to complete part number.



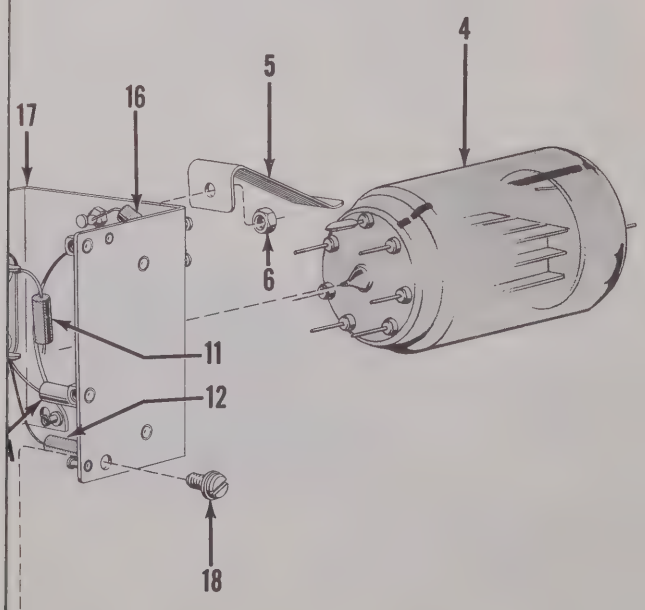


Figure 3. Transmitter Assembly
(Sheet 1 of 2)

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
3-61	20624	. . BEARING, Ball (ND)(SSRS77NR4HGZD-1228E)	2
		(ATTACHING PARTS)	
-62	20622	. . WASHER, Flat	2
-63	20623	. . RING, Retaining (WKI)(5101-62-W)	2
		- - - * - - -	
-64	19443	. . PLATE.	2
-65	19478	. . STUD, Threaded	2
-66	19669	. . PLATE.	1
		(ATTACHING PARTS)	
-67	503(5/16)	. . SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 5/16 in. lg (SH)(SEMS)	3
		- - - * - - -	
-68	19374	. . POST	4
-69	19336	. . PLATE, Contact	2
-70	19661	. . PANEL.	1
-71	19623	. DIAL.	1
-72	19624	. DIAL.	1
-73	19650	. SPRING, Tension	2
		(ATTACHING PARTS)	
-74	503(3/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 3/16 in. lg (SH)(SEMS)	8
		- - - * - - -	
-74A	26298	. INSULATOR	1
-75	19657(*)[1]	. CRYSTAL UNIT, Quartz	20
-76	19658(*)[1]	. CRYSTAL UNIT, Quartz	18
-77	19473	. GEAR-CAM SUBASSEMBLY	1
		(ATTACHING PARTS)	
-78	20625	. RING, Retaining (WKI)(5101-56-W)	1
-79	21322	. WASHER, Flat	1
		- - - * - - -	
-80	21373	. PLATE SUBASSEMBLY	1
		(ATTACHING PARTS)	
-81	336(1/8)	. SETSCREW, Fluted socket dr, flat point, sst, 6-32 thd by 1/8 in. lg	1
-82	10274	. DISC	1
		- - - * - - -	
	19372	. PLATE SUBASSEMBLY	1
		(ATTACHING PARTS)	
-83	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	8
-84	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-85	20620	. . BEARING, Ball (ND)(SSRS77NR3HGZD1228E)	1
		(ATTACHING PARTS)	
-86	20625	. . RING, Retaining (WKI)(5101-56-W)	1
-87	20621	. . WASHER, Flat, al aly, 0.565 ID by 0.781 OD by 0.032 in. thk	1
		- - - * - - -	
-88	8796(120)	. . CAPACITOR, Fixed, ceramic, 120 $\mu\mu$f ±5 per cent, 500 vdcw	1
-89	8877(0.68)	. . CHOKE, RF, 0.68 μh ±20 per cent (JFE)(10100-628)	1
-90	21303	. . TERMINAL BLOCK	1
		(ATTACHING PARTS)	
-91	103(1/2)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/2 in. lg	2
-92	4561	. . NUT, Hexagon, brs, ni pl, 3-48 thd by 0.062 in. thk	2
-93	13473	. . WASHER, Spring tension.	2
		- - - * - - -	
-94	19380	. . TERMINAL BLOCK	1

[1]Insert crystal frequency in megacycles in place of (*) to complete part number.

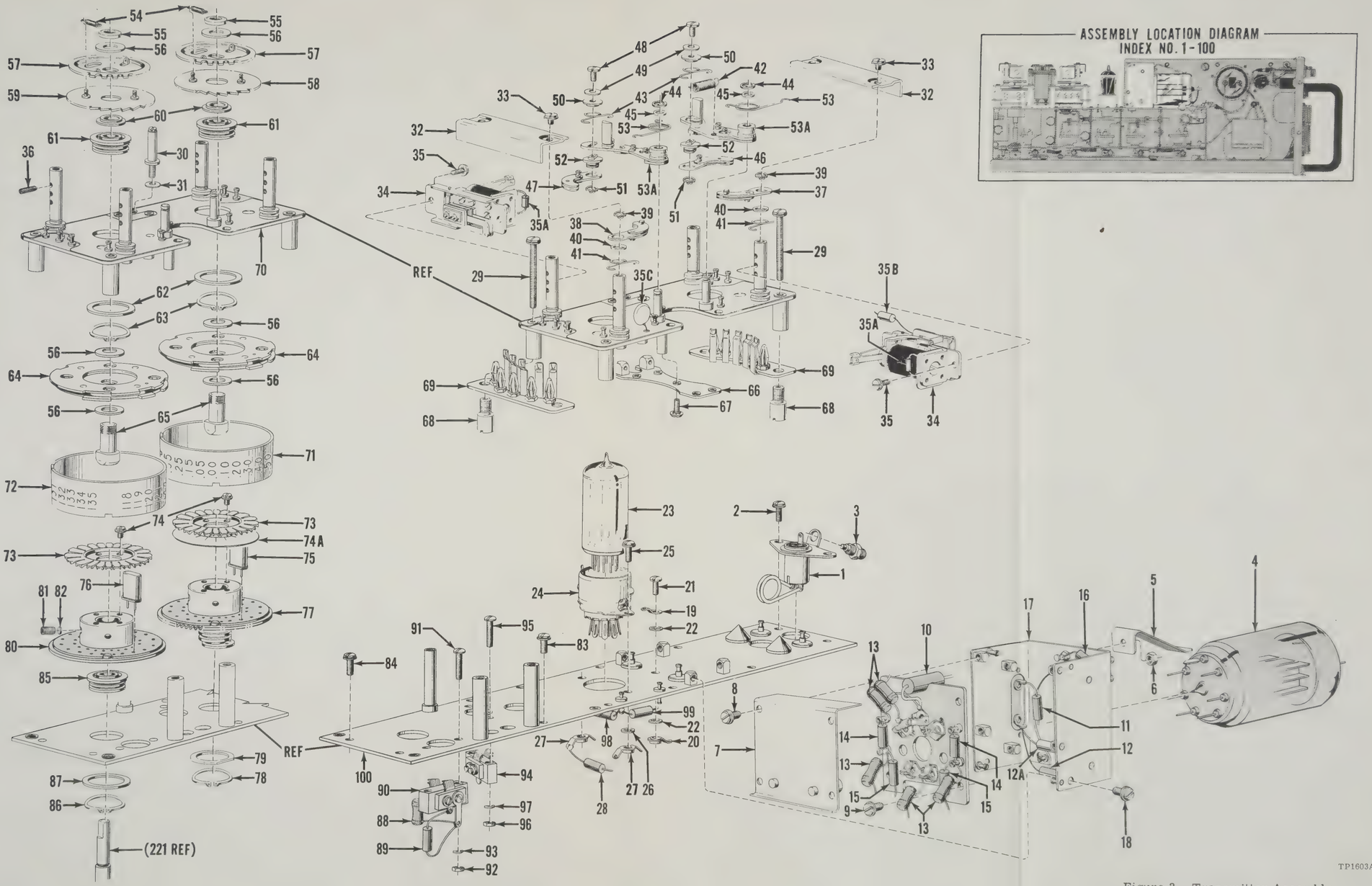


Figure 3. Transmitter Assembly
(Sheet 1 of 2)

Figure 3. Transmitter Assembly
(Sheet 2 of 2)

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
		(ATTACHING PARTS)	
3-95	103(1/2)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/2 in. lg	2
-96	4561	. . NUT, Plain hex, brs, ni pl, 3-48 thd by 0.062 in. thk . . .	2
-97	13473	. . WASHER, Spring tension	2
		- - - * - - -	
-98	201(10K)	. . RESISTOR, Fixed, comp, 10,000 ohms ±5 per cent, 1/2w . (AB)(EB1035)	1
-99	201(1K)	. . RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, ... 1/2w (AB)(EB1025)	1
-100	—	. . PLATE, Mounting, consists of 1 post 19375, 2 posts 19376, . 4 inserts 5139, 4 inserts 16487, and 1 plate 19373	1
	19597	. PLATE OSCILLATOR SUBASSEMBLY	1
		(ATTACHING PARTS)	
-101	504(9/32)	. SCREW, Assembled washer, bind hd, brs screws, sst . . . . lockwasher, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-102	19603	. . CAPACITOR, Variable, air dielectric	1
-102A	29737-0002	. . CAPACITOR, Variable, air dielectric (JFD)(VC20G)	1
		(ATTACHING PARTS)	
-103	103(3/16)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by . . . . 3/16 in. lg	2
-103A	—	. . NUT, Hexagon, No. 10-32 thd (supplied with item 102, . . . Figure 3)	1
-103B	8489	. . WASHER, Lock, sst. 0.199 ID by 0.375 OD by 0.039 in. thk . (SH)(1710)	2
		- - - * - - -	
-104	19422	. . CONNECTOR, Receptacle, electrical	1
		(ATTACHING PARTS)	
-105	103(1/4)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg	2
-106	13473	. . WASHER, Spring tension.	2
		- - - * - - -	
-107	8832	. . CAPACITOR, Fixed, ceramic, 1000 $\mu\mu$f ±20 per cent, . . . 500 vdcw (SLM)(CF-100-2-1022)	3
-107A	28290	. . CAPACITOR, Fixed, ceramic, 1000 $\mu\mu$f GMV, 500 vdcw . .	3
-108	201(33K)	. . RESISTOR, Fixed, comp, 33,000 ohms ±5 per cent, 1/2w . (AB)(EB3335)	1
-108A	201(15K)	. . RESISTOR, Fixed, comp, 15,000 ohms ±5 per cent, ... 1/2w (AB)(EB1535)	1
-109	201(20K)	. . RESISTOR, Fixed, comp, 20,000 ohms ±5 per cent, ... 1/2w (AB)(EB2035)	1
-110	8870(51)	. . CAPACITOR, Fixed, mica, 51 $\mu\mu$f ±5 per cent, 500 vdcw . (EMM)(type VTDM-15)	2
-111	204(10)	. . RESISTOR, Fixed, comp, 10 ohms ±10 per cent, 1/4w . . . (GBR)(997-10)	1
-112	200(33K)	. . RESISTOR, Fixed, comp, 33,000 ohms ±10 per cent, . . . 1/4w (AB)(CB3331)	1
-113	200(220)	. . RESISTOR, Fixed, comp, 220 ohms ±10 per cent, ... 1/4w (AB)(CB2211)	2
-114	700-136	. . ELECTRON TUBE, Type 6021	1
-115	19598	. . PLATE	1
-116	19620	. COIL	1
-117	8791(20)	. CAPACITOR, Fixed, ceramic, 20 $\mu\mu$f ±2 per cent, 500 vdcw .	1
-118	8795(2.0)	. CAPACITOR, Fixed, ceramic, 2 $\mu\mu$f ±0.25 per cent, 500 vdcw .	1
-119	19923	. COIL	1
-120	8765(24)	. CAPACITOR, Fixed, ceramic dielectric, 24 $\mu\mu$f ±2 per cent, . 500 vdcw (CC20HG240G)(JAN-C-20A)	2
-120A	31090-9201	. CAPACITOR, Fixed, ceramic, 2 $\mu\mu$f ±0.25 $\mu\mu$f, 500 vdcw . .	1
-121	21326	. CAPACITOR, Variable, air dielectric	1
		(ATTACHING PARTS)	
-122	504(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . lockwasher, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	1

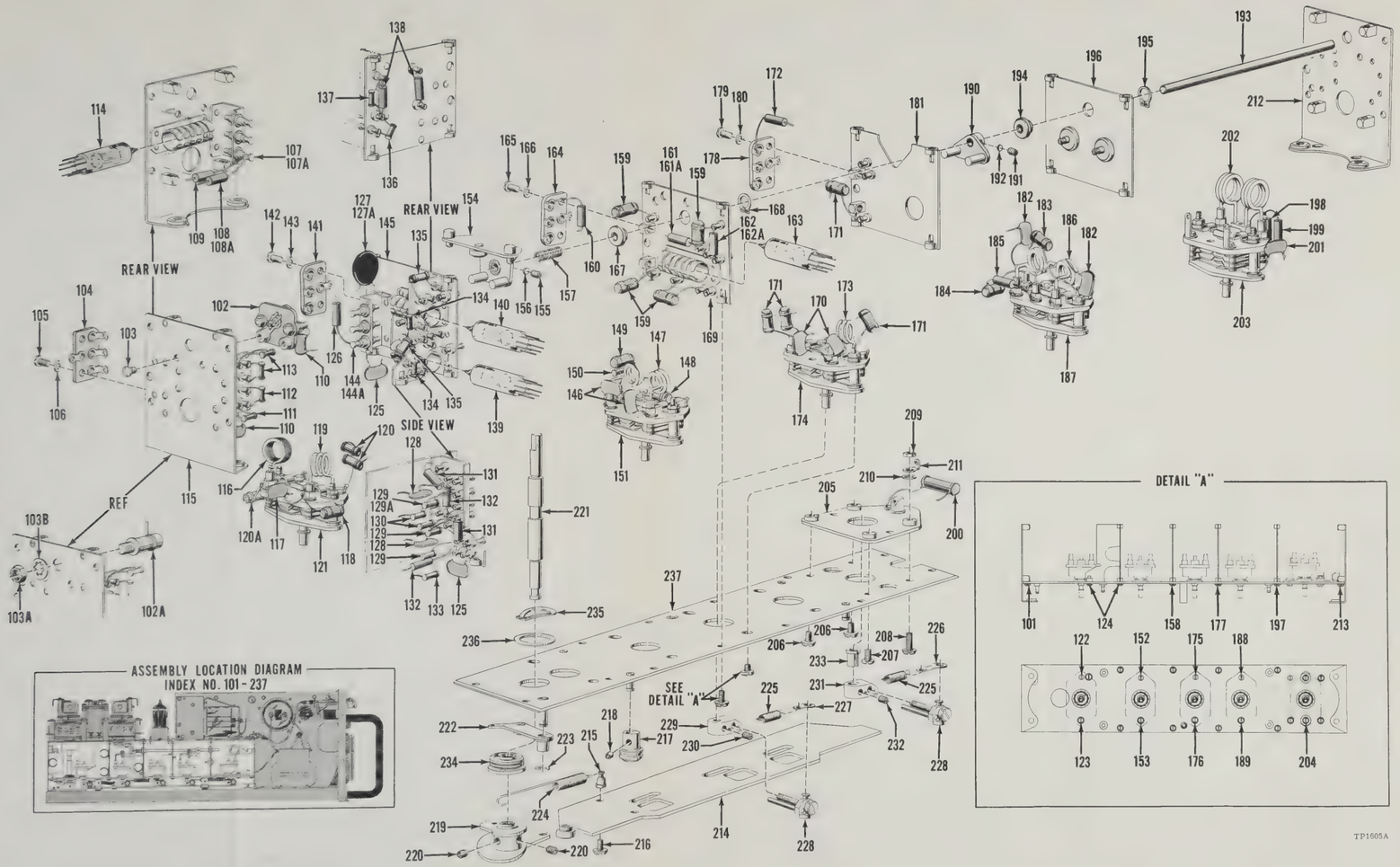


Figure 3. Transmitter Assembly
(Sheet 2 of 2)

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
		(ATTACHING PARTS)	
3-95	103(1/2)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/2 in. lg	2
-96	4561	. . NUT, Plain hex, brs, ni pl, 3-48 thd by 0.062 in. thk . . .	2
-97	13473	. . WASHER, Spring tension	2
		- - - * - - -	
-98	201(10K)	. . RESISTOR, Fixed, comp, 10,000 ohms ±5 per cent, 1/2w . (AB)(EB1035)	1
-99	201(1K)	. . RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, ... 1/2w (AB)(EB1025)	1
-100	—	. . PLATE, Mounting, consists of 1 post 19375, 2 posts 19376, . . 4 inserts 5139, 4 inserts 16487, and 1 plate 19373	1
	19597	. PLATE OSCILLATOR SUBASSEMBLY . . . . . (ATTACHING PARTS)	1
-101	504(9/32)	. SCREW, Assembled washer, bind hd, brs screws, sst . . . . lockwasher, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-102	19603	. . CAPACITOR, Variable, air dielectric	1
-102A	29737-0002	. . CAPACITOR, Variable, air dielectric (JFD)(VC20G) . . . . (ATTACHING PARTS)	1
-103	103(3/16)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by . . . . 3/16 in. lg	2
-103A	—	. . NUT, Hexagon, No. 10-32 thd (supplied with item 102, . . . Figure 3)	1
-103B	8489	. . WASHER, Lock, sst. 0.199 ID by 0.375 OD by 0.039 in. thk . (SH)(1710)	2
		- - - * - - -	
-104	19422	. . CONNECTOR, Receptacle, electrical . . . . . (ATTACHING PARTS)	1
-105	103(1/4)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg	2
-106	13473	. . WASHER, Spring tension.	2
		- - - * - - -	
-107	8832	. . CAPACITOR, Fixed, ceramic, 1000 $\mu\mu$f ±20 per cent, . . . 500 vdcw (SLM)(CF-100-2-1022)	3
-107A	28290	. . CAPACITOR, Fixed, ceramic, 1000 $\mu\mu$f GMV, 500 vdcw . .	3
-108	201(33K)	. . RESISTOR, Fixed, comp, 33,000 ohms ±5 per cent, 1/2w . (AB)(EB3335)	1
-108A	201(15K)	. . RESISTOR, Fixed, comp, 15,000 ohms ±5 per cent, ... 1/2w (AB)(EB1535)	1
-109	201(20K)	. . RESISTOR, Fixed, comp, 20,000 ohms ±5 per cent, ... 1/2w (AB)(EB2035)	1
-110	8870(51)	. . CAPACITOR, Fixed, mica, 51 $\mu\mu$f ±5 per cent, 500 vdcw . (EMM)(type VTDM-15)	2
-111	204(10)	. . RESISTOR, Fixed, comp, 10 ohms ±10 per cent, 1/4w . . . (GBR)(997-10)	1
-112	200(33K)	. . RESISTOR, Fixed, comp, 33,000 ohms ±10 per cent, . . . 1/4w (AB)(CB3331)	1
-113	200(220)	. . RESISTOR, Fixed, comp, 220 ohms ±10 per cent, ... 1/4w (AB)(CB2211)	2
-114	700-136	. . ELECTRON TUBE, Type 6021	1
-115	19598	. . PLATE	1
-116	19620	. COIL	1
-117	8791(20)	. CAPACITOR, Fixed, ceramic, 20 $\mu\mu$f ±2 per cent, 500 vdcw .	1
-118	8795(2.0)	. CAPACITOR, Fixed, ceramic, 2 $\mu\mu$f ±0.25 per cent, 500 vdcw .	1
-119	19923	. COIL	1
-120	8765(24)	. CAPACITOR, Fixed, ceramic dielectric, 24 $\mu\mu$f ±2 per cent, . 500 vdcw (CC20HG240G)(JAN-C-20A)	2
-120A	31090-9201	. CAPACITOR, Fixed, ceramic, 2 $\mu\mu$f ±0.25 $\mu\mu$f, 500 vdcw . .	1
-121	21326	. CAPACITOR, Variable, air dielectric . . . . . (ATTACHING PARTS)	1
-122	504(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . lockwasher, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
3-123	104(3/16)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 3/16 in. lg	1
		- - - * - - -	
	19592	. PLATE MIXER SUBASSEMBLY	1
		(ATTACHING PARTS)	
-124	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg	3
		- - - * - - -	
-125	8870(51)	. CAPACITOR, Fixed, mica, 51 μμf ±5 per cent, 500 vdcw (EMM)(VTDM-15)	2
-126	15174	. CHOKE, 14 μh ±10 per cent (JFE)(CF Ir-7/16)	1
-127	8627(0.01)	. CAPACITOR, Fixed, ceramic, 0.01 μf ±20 per cent, 500 vdcw (AB)(36-103W)	1
-127A	8627(0.022)	. CAPACITOR, Fixed, ceramic, 0.022 μf +80 -20 per cent, 500 vdcw	1
-128	8870(240)	. CAPACITOR, Fixed, mica, 240 μμf ±5 per cent, 500 vdcw (EMM)(VTDM-15)	2
-129	200(240)	. RESISTOR, Fixed, comp, 240 ohms ±10 per cent, 1/4w (AB)(CB2411)	3
-129A	200(1K)	. RESISTOR, Fixed, comp, 1000 ohms ±10 per cent, 1/4w (AB)(CB1001)	3
-130	200(22K)	. RESISTOR, Fixed, comp, 22,000 ohms ±10 per cent, 1/4w (AB)(CB2231)	2
-131	8877(1.0)	. CHOKE, 1.0 μh ±20 per cent at 230 mc (JFE)(10100-630)	2
-132	14141	. CHOKE, 3 μh ±10 per cent (JFE)(10100-652)	2
-133	200(100K)	. RESISTOR, Fixed, comp, 100,000 ohms ±10 per cent, 1/4w (AB)(CB1041)	1
-134	200(39K)	. RESISTOR, Fixed, comp, 39,000 ohms ±10 per cent, 1/4w (AB)(CB3931)	2
-135	8765(24)	. CAPACITOR, Fixed, ceramic, 24 μμf ±2 per cent, 500 vdcw (CC20HG240G)(JAN-C-20A)	2
-136	200(560)	. RESISTOR, Fixed, comp, 560 ohms ±10 per cent, 1/4w (AB)(CB5611)	1
-137	200(4700)	. RESISTOR, Fixed, comp, 4700 ohms ±10 per cent, 1/4w (AB)(CB4721)	1
-138	8877(0.68)	. CHOKE, 0.68 μh ±20 per cent at 285 mc (JFE)(10100-628)	2
-139	700-122	. ELECTRON TUBE, Type 5718	1
-140	700-136	. ELECTRON TUBE, Type 6021	1
-141	19422	. RECEPTACLE	1
		(ATTACHING PARTS)	
-142	103(1/4)	. SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg	2
-143	13473	. WASHER, Spring tension	2
		- - - * - - -	
-144	8832	. CAPACITOR, Fixed, ceramic, 1000 μμf ±20 per cent, 500 vdcw (SLM)(CF-100-2-1022)	3
-144A	28290	. CAPACITOR, Fixed, ceramic, 1000 μμf GMV, 500 vdcw	3
-145	19593	. PLATE	1
-146	8791(20)	. CAPACITOR, Fixed, ceramic, 20 μμf ±2 per cent, 500 vdcw	2
-147	19619	. COIL.	1
-148	8791(4)	. CAPACITOR, Fixed, ceramic, 4 μμf ±0.25 per cent, 500 vdcw	1
-149	8791(7)	. CAPACITOR, Fixed, ceramic, 7 μμf ±0.25 per cent, 500 vdcw	1
-150	200(33K)	. RESISTOR, Fixed, comp, 33,000 ohms ±10 per cent, 1/4w (AB)(CB3331)	1
-151	21326	. CAPACITOR, Variable, air dielectric	1
		(ATTACHING PARTS)	
-152	504(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	1
-153	104(3/16)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 3/16 in. lg	1
		- - - * - - -	
-154	19451	. BRACKET	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
		(ATTACHING PARTS)	
3-155	304(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 1/8 in. lg	1
-156	10290	. DISC	1
-157	20612	. SPRING, Helical, compression	1
	19588	. PLATE AMPLIFIER SUBASSEMBLY	1
		(ATTACHING PARTS)	
-158	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lock-washer, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
-159	8796(120)	. CAPACITOR, Fixed, ceramic, 120 μμf ±5 per cent, 500 vdcw	4
-160	201(4700)	. RESISTOR, Fixed, comp, 4700 ohms ±5 per cent, 1/2 w (AB)(EB4725)	1
-161	8877(3.3)	. CHOKE, 3.3 μh ±10 per cent (JFE)(10102-620)	1
-161A	14141	. CHOKE, 3 μh ±10 per cent (JFE)(10100-652)	1
-162	201(1K)	. RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, 1/2 w (AB) (EB1025)	1
-162A	201(150)	. RESISTOR, Fixed, comp, 150 ohms ±5 per cent, 1/2 w (AB) (EB1515)	1
-163	700-129	. ELECTRON TUBE, Type 5840	1
-164	19422	. RECEPTACLE	1
		(ATTACHING PARTS)	
-165	103(1/4)	. SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg	2
-166	13473	. WASHER, Spring tension	2
-167	19584	. BEARING	1
		(ATTACHING PARTS)	
-168	16171	. RING, Retaining (WKI)(5100-25-W)	1
-169	19589	. PLATE	1
-170	8870(51)	. CAPACITOR, Fixed, mica, 51 μμf ±5 per cent, 500 vdcw (EMM)(VTDM-15-51)	2
-171	8796(120)	. CAPACITOR, Fixed, ceramic, 120 μμf ±5 per cent, 500 vdcw	4
-172	201(10K)	. RESISTOR, Fixed, comp, 10,000 ohms ±5 per cent, 1/2 w (AB)(EB1035)	1
-173	19620	. COIL	1
-174	21326	. CAPACITOR, Variable, air dielectric	1
		(ATTACHING PARTS)	
-175	504(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock-washer, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	1
-176	104(3/16)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 3/16 in. lg	1
	19585	. PLATE SUBASSEMBLY	1
		(ATTACHING PARTS)	
-177	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lock-washer, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
-178	19422	. . RECEPTACLE	1
		(ATTACHING PARTS)	
-179	103(1/4)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg.	2
-180	13473	. . WASHER, Spring tension	2
-181	19586	. . PLATE	1
-182	8791(20)	. CAPACITOR, Fixed, ceramic, 20 μμf ±2 per cent, 500 vdcw	2
-183	8791(4)	. CAPACITOR, Fixed, ceramic, 4 μμf ±0.25 per cent, 500 vdcw.	1
-184	8796(120)	. CAPACITOR, Fixed, ceramic, 120 μμf ±5 per cent, 500 vdcw	1
-185	8877(1.0)	. CHOKE, 1.0 μh ±20 per cent (JFE)(10100-630)	1
-186	19617	. COIL	1
-187	19639	. CAPACITOR, Variable, air dielectric	1
		(ATTACHING PARTS)	
-188	504(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock-washer, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	1
-189	104(3/16)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 3/16 in. lg	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
3-190	19448	. PLATE	1
		(ATTACHING PARTS)	
-191	304(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 1/8 in. lg	1
-192	10290	. DISC	1
		- - - * - - -	
-193	19659	. SHAFT	1
-194	19584	. BEARING.	1
		(ATTACHING PARTS)	
-195	16171	. RING, Retaining (WKI)(5100-25-W)	1
		- - - * - - -	
-196	19580	. PLATE	1
		(ATTACHING PARTS)	
-197	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
		- - - * - - -	
-198	201(47)	. RESISTOR, Fixed, comp, 47 ohms ±5 per cent, 1/2w (AB)(EB4705)	1
-199	15174	. CHOKE, 14 μh ±10 per cent (JFE)(CF Ir-7/16)	1
-200	8797(300)	. CAPACITOR, Fixed, ceramic, 300 μμf ±5 per cent, 500 vdcw	1
-201	8796(120)	. CAPACITOR, Fixed, ceramic, 120 μμf ±5 per cent, 500 vdcw	1
-202	19616	. COIL.	1
-203	19420	. CAPACITOR, Variable, air dielectric	1
		(ATTACHING PARTS)	
-204	504(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-205	19390	. PLATE, Insulating	1
		(ATTACHING PARTS)	
-206	504(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 1/4 in. lg (SH)(SEMS)	2
-207	104(1/4)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 1/4 in. lg	1
-208	504(3/8)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 3/8 in. lg (SH)(SEMS)	1
-209	8040	. NUT, Hexagon, brs, ni pl, 4-40 thd by 0.062 in. thk	1
-210	8497	. WASHER, Lock, sst, 0.119 ID by 0.260 OD by 0.029 in. thk (SH)(1704-4)	1
-211	5216	. TERMINAL, Lug	1
		- - - * - - -	
-212	19576	. PLATE	1
		(ATTACHING PARTS)	
-213	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-214	19465	. PLATE ASSEMBLY	1
-215	15453	. TERMINAL, Stud	2
		(ATTACHING PARTS)	
-216	504(3/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 3/16 in. lg (SH)(SEMS)	2
		- - - * - - -	
-217	19419	. BEARING.	4
		(ATTACHING PARTS)	
-218	304(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 1/8 in. lg	4
		- - - * - - -	
-219	19424	. CAM.	1
		(ATTACHING PARTS)	
-220	306(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 6-32 thd by 1/8 in. lg	2
		- - - * - - -	
-221	21482	. SHAFT	1

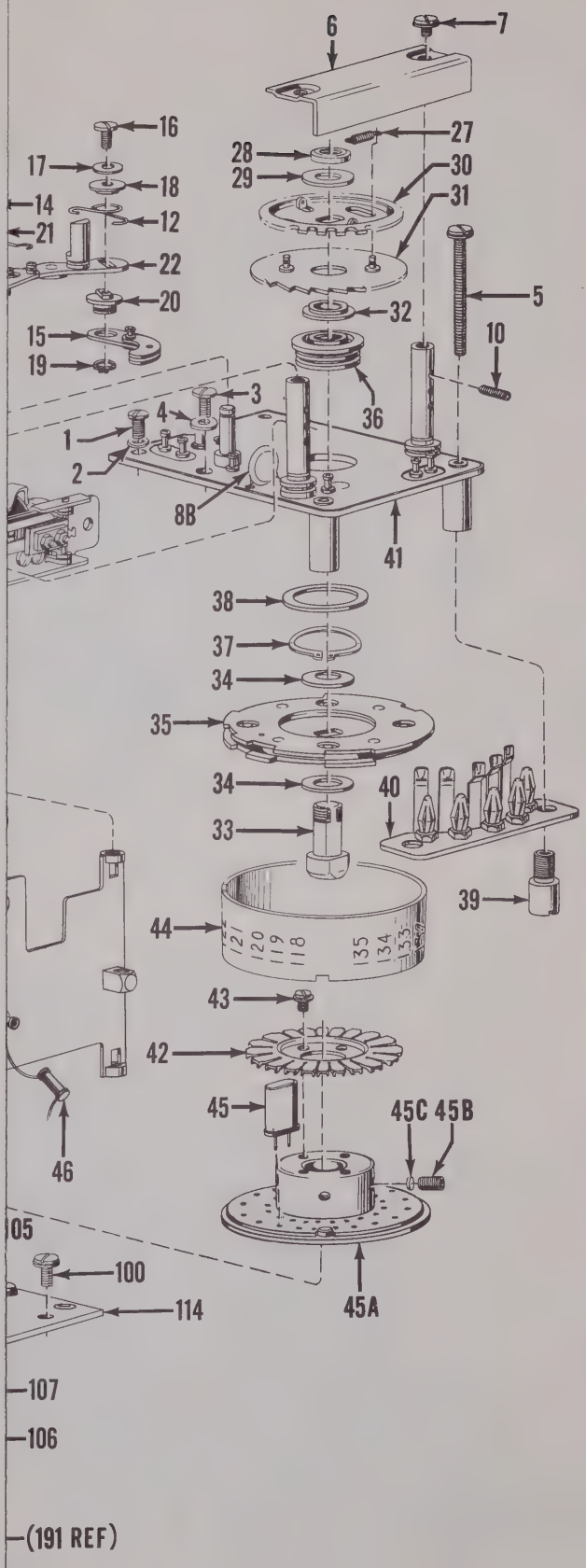
Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
3-222	19367	. LEVER SUBASSEMBLY	1
		(ATTACHING PARTS)	
-223	17326	. RING, Retaining (WKI)(5133-12-C-MF)	1
		- - - * - - -	
-224	19626	. SPRING, Helical, extension	1
-225	14785	. SPRING, Helical, extension	3
-226	4023	. TERMINAL	3
-227	4548	. TERMINAL	2
-228	19467	. ARM ASSEMBLY	5
-229	19645	. BLOCK	4
		(ATTACHING PARTS)	
-230	304(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 1/8 in. lg	4
		- - - * - - -	
-231	19646	. BLOCK	1
		(ATTACHING PARTS)	
-232	304(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 1/8 in. lg	1
		- - - * - - -	
-233	19649	. SLEEVE	1
-234	20620	. BEARING, Ball (ND)(SSRS77NR3HGZD1228E)	1
		(ATTACHING PARTS)	
-235	20625	. RING, Retaining (WKI)(5101-56-W)	1
-236	21322	. WASHER, Flat, al, 0.565 ID by 0.781 OD by 0.032 in. thk	1
		- - - * - - --	
-237	19386	. PLATE, Mounting	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-	20420(14V)	RECEIVER ASSEMBLY (14V)(see 15, Figure 2).	Ref
4-	20420(28V)	RECEIVER ASSEMBLY (28V)(see 15, Figure 2).	Ref
	19990(14V)	. TUNER ASSEMBLY (14V)	1
	19990(28V)	. TUNER ASSEMBLY (28V)	1
		(ATTACHING PARTS)	
-1	103(1/4)	. SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg .	2
-2	10353	. WASHER, Spring tension	2
-3	104(1/4)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 1/4 in. lg .	1
-4	7730	. WASHER, Spring tension	1
-5	504(1-5/16)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 4-40 thd by 1-5/16 in. lg (SH)(SEMS)	2
		- - - * - - -	
-6	20733	. . CONTACT SHIELD	1
		(ATTACHING PARTS)	
-7	503(5/32)	. . SCREW, Assembled washer, bind hd, brs screw, sst . . . lockwasher, ni pl, 3-48 thd by 5/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-8	19664	. . RELAY, Armature (14V).	1
-8	19665	. . RELAY, Armature (28V).	1
-8A	17633	. . SEMICONDUCTOR DEVICE, Diode, type 1N462 (used . . . beginning with M-6 units)	1
-8B	8625(0.001)	. . CAPACITOR, Fixed, ceramic, 0.001 μf GMV, ... 500 vdcw (used in units beginning with M-9)	1
		(ATTACHING PARTS)	
-9	503(5/16)	. . SCREW, Assembled washer, bind hd, brs screw, sst . . . lockwasher, ni pl, 3-48 thd by 5/16 in. lg (SH)(SEMS)	2
		- - - * - - -	
-10	314(1/4)	. . SETSCREW, Fluted socket dr, cone point, sst, ... 4-40 thd by 1/4 in. lg	4
-11	21477	. . SPRING, Helical, extension	1
-12	21504	. . SPRING, Helical, extension	1
	19674	. . LEVER ASSEMBLY (Right hand)	1
		(ATTACHING PARTS)	
-13	17326	. . RING, Retaining (WKI)(5133-12-C-MC)	1
-14	17768	. . WASHER, Flat, sst, 0.128 ID by 0.187 OD by 0.003 in. thk .	AR
		- - - * - - -	
-15	19568	. . . PAWL (Right hand)	1
		(ATTACHING PARTS)	
-16	103(1/4)	. . . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd . . . . . by 1/4 in. lg	1
-17	5727	. . . WASHER, Spring tension	1
-18	19574	. . . WASHER, Shouldered	1
-19	17742	. . . RING, Retaining (WKI)(5100-18-C)	1
-20	19551	. . . POST, Threaded	1
		- - - * - - -	
-21	19570	. . . SPRING, Helical, torsion	1
-22	—	. . . LEVER, c/o 1 bearing 19435, 1 washer 19559, 1 stud. . . 19563, 1 stud 19560, 1 collar 19561, 1 arm 19562, 1 pin 19583, 1 ball bearing 13749, 1 washer 10241, 1 post 19436, 1 lever 19557, all staked together	1
-23	19571	. . PAWL (Right hand)	1
		(ATTACHING PARTS)	
-24	17742	. . RING, Retaining (WKI)(5100-18-C)	1
-25	17765	. . WASHER, Flat, sst, 0.190 ID by 0.234 OD by 0.003 in. thk .	AR
		- - - * - - -	
-26	19566	. . SPRING, Helical, torsion	1
-27	19442	. . SPRING, Helical, extension	2
-28	15181	. . NUT	1
-29	16088	. . WASHER	1
-30	19572	. . PLATE, Indexing	1
-31	19447	. . RATCHET ASSEMBLY (Right hand)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-32	19573	. . BUSHING	1
-33	19478	. . STUD, Threaded, No. 1/4-32 NEF-2	1
-34	16088	. . WASHER	2
-35	19443	. . PLATE.	1
-36	20624	. . BEARING, Ball (ND)(SSRS77NR4HG-Z-D-1228E)	1
		(ATTACHING PARTS)	
-37	20623	. . RING, Retaining (WKI)(5101-62-W)	1
-38	20622	. . WASHER, Flat, al aly, 0.630 ID by 0.844 OD by 0.032 in.thk	1
		- - - * - - -	
-39	19374	. . POST	2
-40	19336	. . PLATE, Contact	1
-41	20304	. . PANEL.	1
-42	19650	. SPRING, Tension	1
		(ATTACHING PARTS)	
-43	503(3/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 3/16 in. lg (SH)(SEMS)	4
		- - - * - - -	
-44	19625	. DIAL.	1
-45	19658(*)[1]	. CRYSTAL UNIT, Quartz	18
-45A	19460	. PLATE ASSEMBLY	1
		(ATTACHING PARTS)	
-45B	336(1/8)	. SETSCREW, Fluted socket dr, fp, sst, 6-32 thd by 1/8 in. lg (supplied with 45A, Figure 4)	2
-45C	10274	. DISC	2
		- - - * - - -	
-46	200(47)	. RESISTOR, Fixed, comp, 47 ohms ±10 per cent, 1/4w (AB)(CB4701)	1
	19942	. PLATE ASSEMBLY, RF	1
		(ATTACHING PARTS)	
-47	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
-48	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-49	8278	. . CAPACITOR, Fixed, ceramic, 3 μμf ±0.25 μμf	2
-50	19946	. . CAPACITOR, Trimmer	2
		(ATTACHING PARTS)	
-51	502(5/32)	. . SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 2-56 thd by 5/32 in. lg (SH)(SEMS)	4
		- - - * - - -	
-52	20620	. . BEARING, Ball (ND)(SSRS77NR3HG-ZD-1228E).	1
		(ATTACHING PARTS)	
-53	20625	. . RING, Retaining (WKI)(5101-56-W)	1
-54	20621	. . WASHER, Flat, al aly, 0.565 ID by 0.781 OD by 0.032 in. thk.	1
		- - - * - - -	
-55	19943	. . PLATE.	1
-56	19892	. PLATE	2
		(ATTACHING PARTS)	
-57	4058	. SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 3/16 in. lg	22
		- - - * - - -	
-58	19879	. PLATE	1
		(ATTACHING PARTS)	
-59	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
		- - - * - - -	
	19685	. SHAFT SUBASSEMBLY	1
		(ATTACHING PARTS)	
-60	304(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 1/8 in. lg	1
-61	7117	. WASHER, Flat, sst, 0.192 ID by 0.281 OD by 0.005 in. thk	AR

[1] Insert crystal frequency in megacycles in place of (*) to complete part number.

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-62	21478	. WASHER, Flat, brs, ni pl, 0.191 ID by 0.281 OD by 0.020 in. thk	AR
		- - - * - - -	
-63	19688	. . CAM	1
		(ATTACHING PARTS)	
-64	8775(5/16)	. . PIN (ESNA)(79-012-062)	1
		- - - * - - -	
-65	19686	. . ARM	1
-66	19681	. . GEAR, Spur.	1
		(ATTACHING PARTS)	
-67	16171	. . RING, Retaining (WKI)(5100-25-W)	1
-68	306(3/16)	. . SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 3/16 in. lg	2
		- - - * - - -	
-69	19687	. . SHAFT	1
	19716	. PLATE ASSEMBLY, Variable IF	1
		(ATTACHING PARTS)	
-70	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
		- - - * - - -	
-71	200(680)	. . RESISTOR, Fixed, comp, 680 ohms ±10 per cent, 1/4w (AB)(CB6811)	1
-72	8554	. . CAPACITOR, Fixed, ceramic, 2700 μμf ±10 per cent, 500 vdcw	1
-73	8837	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1GS-10)	1
-74	201(22K)	. . RESISTOR, Fixed, comp, 22,000 ohms ±5 per cent, 1/2w (AB)(EB2235)	1
-75	8848	. . CAPACITOR, Fixed, mica, 91 μμf ±1 per cent, 500 vdcw (EMM)(VTDM-15-91)	1
-76	200(82K)	. . RESISTOR, Fixed, comp, 82,000 ohms ±10 per cent, 1/4 w (AB)(CB8231)	1
-77	8879(0.82)	. . CAPACITOR, Fixed, electrolytic, 0.82 μμf ± 5 per cent, 500 vdcw (STL)(GA)	1
-78	8848	. . CAPACITOR, Fixed, mica, 91 μμf ±1 per cent, 500 vdcw (EMM)(VTDM-15-91)	1
-79	200(82K)	. . RESISTOR, Fixed, comp, 82,000 ohms ±10 per cent, 1/4w (AB)(CB8231)	1
-80	201(100K)	. . RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w (AB)(EB1045)	1
-81	8835	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1-10)	1
-81A	26825-0222	. . CAPACITOR, Fixed, ceramic, 2200 μμf ±20 per cent, 500 vdcw (ERC)(type EW)	1
-82	700-132	. . ELECTRON TUBE, Type 5899	1
-83	19732	. . TUNING ARM	1
-84	19871	. . SPRING, Helical, compression	1
-85	19698	. . TUNING SLUG	2
-86	19869	. . SPRING, Helical, compression	1
-87	19715	. . COIL, Variable inductor	2
		(ATTACHING PARTS)	
-88	4697	. . NUT, Serrated	2
-89	8540	. . WASHER, Lock, 0.384 ID by 0.500 OD by 0.022 in. thk (SH)(1920-02)	2
		- - - * - - -	
-90	19724	. . BEARING	1
-91	201(27K)	. . RESISITOR, Fixed, comp, 27,000 ohms ±5 per cent, 1/2w (AB)(EB2735)	1
-92	8835	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1-10)	1



TP1607A

Figure 4. Receiver Assembly
(Sheet 1 of 2)

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-62	21478	. WASHER, Flat, brs, ni pl, 0.191 ID by 0.281 OD by 0.020 in. thk	AR
		- - - * - - -	
-63	19688	. . CAM	1
		(ATTACHING PARTS)	
-64	8775(5/16)	. . PIN (ESNA)(79-012-062)	1
		- - - * - - -	
-65	19686	. . ARM	1
-66	19681	. . GEAR, Spur	1
		(ATTACHING PARTS)	
-67	16171	. . RING, Retaining (WKI)(5100-25-W)	1
-68	306(3/16)	. . SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 3/16 in. lg	2
		- - - * - - -	
-69	19687	. . SHAFT	1
	19716	. PLATE ASSEMBLY, Variable IF	1
		(ATTACHING PARTS)	
-70	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
		- - - * - - -	
-71	200(680)	. . RESISTOR, Fixed, comp, 680 ohms ±10 per cent, 1/4w (AB)(CB6811)	1
-72	8554	. . CAPACITOR, Fixed, ceramic, 2700 μμf ±10 per cent, 500 vdcw	1
-73	8837	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1GS-10)	1
-74	201(22K)	. . RESISTOR, Fixed, comp, 22,000 ohms ±5 per cent, 1/2w (AB)(EB2235)	1
-75	8848	. . CAPACITOR, Fixed, mica, 91 μμf ±1 per cent, 500 vdcw (EMM)(VTDM-15-91)	1
-76	200(82K)	. . RESISTOR, Fixed, comp, 82,000 ohms ±10 per cent, 1/4 w (AB)(CB8231)	1
-77	8879(0.82)	. . CAPACITOR, Fixed, electrolytic, 0.82 μμf ±5 per cent, 500 vdcw (STL)(GA)	1
-78	8848	. . CAPACITOR, Fixed, mica, 91 μμf ±1 per cent, 500 vdcw (EMM)(VTDM-15-91)	1
-79	200(82K)	. . RESISTOR, Fixed, comp, 82,000 ohms ±10 per cent, 1/4w (AB)(CB8231)	1
-80	201(100K)	. . RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w (AB)(EB1045)	1
-81	8835	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1-10)	1
-81A	26825-0222	. . CAPACITOR, Fixed, ceramic, 2200 μμf ±20 per cent, 500 vdcw (ERC)(type EW)	1
-82	700-132	. . ELECTRON TUBE, Type 5899	1
-83	19732	. . TUNING ARM	1
-84	19871	. . SPRING, Helical, compression	1
-85	19698	. . TUNING SLUG	2
-86	19869	. . SPRING, Helical, compression	1
-87	19715	. . COIL, Variable inductor	2
		(ATTACHING PARTS)	
-88	4697	. . NUT, Serrated	2
-89	8540	. . WASHER, Lock, 0.384 ID by 0.500 OD by 0.022 in. thk (SH)(1920-02)	2
		- - - * - - -	
-90	19724	. . BEARING	1
-91	201(27K)	. . RESISITOR, Fixed, comp, 27,000 ohms ±5 per cent, 1/2w (AB)(EB2735)	1
-92	8835	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1-10)	1

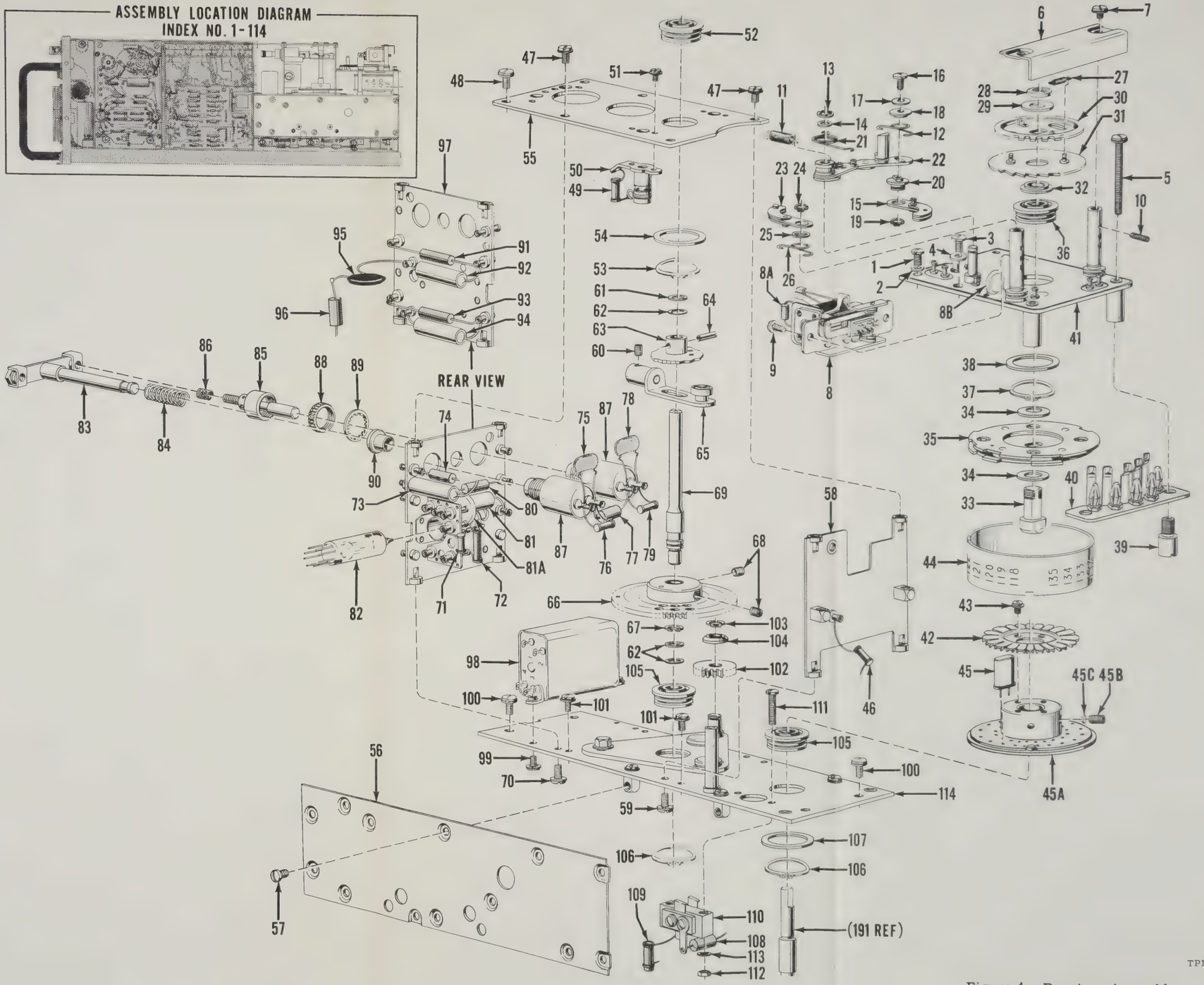


Figure 4. Receiver Assembly
(Sheet 1 of 2)

Figure 4. Receiver Assembly
(Sheet 2 of 2)

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-93	201(100K)	. . RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, ... 1/2 w (AB)(EB1045)	1
-94	8835	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 . . . vdcw (CLD)(TWA3S1-10)	1
-95	8627(0.022)	. . CAPACITOR, Fixed, ceramic, 0.022 μf ±20 per cent, 500 . vdcw (AB)(40-223W)	1
-96	8877(15)	. . CHOKE, RF, 15 μh ±20 per cent (JFE)(10100-620)	1
-97	19692	. . PLATE	1
-98	19968	. TRANSFORMER, IF. . . . . (ATTACHING PARTS)	1
-99	502(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 2-56 thd by 7/32 in. lg (SH)(SEMS)	2
		- - - *- - -	
	19944	. PLATE ASSEMBLY, RF, Middle . . . . . (ATTACHING PARTS)	1
-100	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	4
-101	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
		- - - *- - -	
-102	19950	. . GEAR, Spur . . . . . (ATTACHING PARTS)	1
-103	17742	. . RING, Retaining (WKI)(5100-18-C)	1
-104	3684	. . WASHER, Beveled	1
		- - - *- - -	
-105	20620	. . BEARING, Ball (ND)(SSRS77NR3HG-ZD1228E) . . . . . (ATTACHING PARTS)	2
-106	20625	. . RING, Retaining (WKI)(5101-56-W)	2
-107	20621	. . WASHER, Flat, al aly, 0.565 ID by 0.781 OD by 0.032 in. thk.	1
		- - - *- - -	
-108	8877(0.68)	. . CHOKE, RF, 0.68 μh ±20 per cent (JFE)(10100-628)	1
-109	8535	. . CAPACITOR, Fixed, ceramic, 250 μμf ±20 per cent, 500 . . vdcw (CN)(BU20251MV5V)	1
-110	21303	. . TERMINAL ASSEMBLY . . . . . (ATTACHING PARTS)	1
-111	103(1/2)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/2 in. lg.	2
-112	4561	. . NUT, Hexagon, brs, ni pl, 3-48 thd by 0.062 in. thk	2
-113	13473	. . WASHER, Spring tension.	2
		- - - *- - -	
-114	19945	. . PLATE	1
	19884	. PLATE ASSEMBLY, Oscillator. . . . . (ATTACHING PARTS)	1
-115	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - *- - -	
-116	201(1500)	. . RESISTOR, Fixed, comp, 1500 ohms ±5 per cent, 1/2 w . . (AB)(EB1525)	1
-117	8832	. . CAPACITOR, Fixed, ceramic, 1000 μμf ±20 per cent, 500 . vdcw (SLM)(CF-100-2-1022)	2
-118	19603	. . CAPACITOR, Variable, air dielectric. . . . . (ATTACHING PARTS)	1
-119	103(3/16)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 3/16 in. l. in. lg	2
		- - - *- - -	
-119A	29737-0002	. . CAPACITOR, Variable, air dielectric (JFD)(VC20G) . . . . (ATTACHING PARTS)	1
-119B	—	. . NUT, Hexagon, No. 10-32 thd (supplied with item 119A, . . Figure 4)	1
-119C	8489	. . WASHER, Lock, sst, 0.199 ID by 0.375 OD by 0.039 in. thk . (SH)(1710)	1
		- - - *- - -	
-120	200(220)	. . RESISTOR, Fixed, comp, 220 ohms ±10 per cent, 1/4 w . . (AB)(CB2211)	2

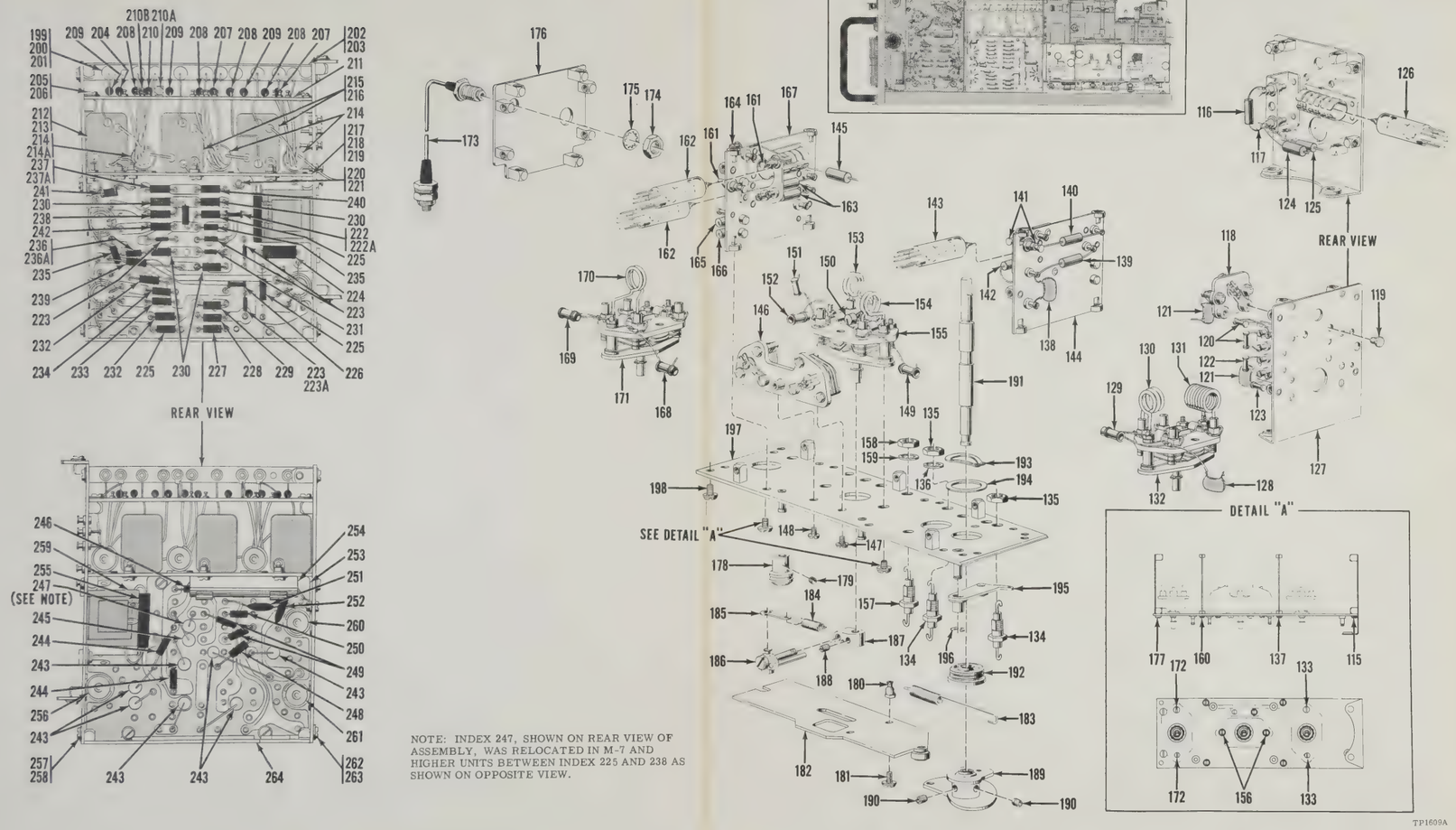

ASSEMBLY LOCATION DIAGRAM
INDEX NO. 115 - 264
REAR VIEW
REAR VIEW
SEE DETAIL "A"
DETAIL "A"
(SEE NOTE)
NOTE: INDEX 247, SHOWN ON REAR VIEW OF ASSEMBLY, WAS RELOCATED IN M-7 AND HIGHER UNITS BETWEEN INDEX 225 AND 238 AS SHOWN ON OPPOSITE VIEW.
TP1609A

Figure 4. Receiver Assembly
(Sheet 2 of 2)

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-93	201(100K)	. . RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, ... 1/2 w (AB)(EB1045)	1
-94	8835	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 . . . vdcw (CLD)(TWA3S1-10)	1
-95	8627(0.022)	. . CAPACITOR, Fixed, ceramic, 0.022 μf ±20 per cent, 500 . vdcw (AB)(40-223W)	1
-96	8877(15)	. . CHOKE, RF, 15 μh ±20 per cent (JFE)(10100-620)	1
-97	19692	. . PLATE	1
-98	19968	. TRANSFORMER, IF. . . . . (ATTACHING PARTS)	1
-99	502(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 2-56 thd by 7/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
	19944	. PLATE ASSEMBLY, RF, Middle . . . . . (ATTACHING PARTS)	1
-100	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	4
-101	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
		- - - * - - -	
-102	19950	. . GEAR, Spur . . . . . (ATTACHING PARTS)	1
-103	17742	. . RING, Retaining (WKI)(5100-18-C)	1
-104	3684	. . WASHER, Beveled	1
		- - - * - - -	
-105	20620	. . BEARING, Ball (ND)(SSRS77NR3HG-ZD1228E) . . . . . (ATTACHING PARTS)	2
-106	20625	. . RING, Retaining (WKI)(5101-56-W)	2
-107	20621	. . WASHER, Flat, al aly, 0.565 ID by 0.781 OD by 0.032 in. thk.	1
		- - - * - - -	
-108	8877(0.68)	. . CHOKE, RF, 0.68 μh ±20 per cent (JFE)(10100-628)	1
-109	8535	. . CAPACITOR, Fixed, ceramic, 250 μμf ±20 per cent, 500 . . vdcw (CN)(BU20251MV5V)	1
-110	21303	. . TERMINAL ASSEMBLY . . . . . (ATTACHING PARTS)	1
-111	103(1/2)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/2 in. lg.	2
-112	4561	. . NUT, Hexagon, brs, ni pl, 3-48 thd by 0.062 in. thk	2
-113	13473	. . WASHER, Spring tension.	2
		- - - * - - -	
-114	19945	. . PLATE	1
	19884	. PLATE ASSEMBLY, Oscillator. . . . . (ATTACHING PARTS)	1
-115	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-116	201(1500)	. . RESISTOR, Fixed, comp, 1500 ohms ±5 per cent, 1/2 w . . (AB)(EB1525)	1
-117	8832	. . CAPACITOR, Fixed, ceramic, 1000 μμf ±20 per cent, 500 . vdcw (SLM)(CF-100-2-1022)	2
-118	19603	. . CAPACITOR, Variable, air dielectric. . . . . (ATTACHING PARTS)	1
-119	103(3/16)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 3/16 in. l. in. lg	2
		- - - * - - -	
-119A	29737-0002	. . CAPACITOR, Variable, air dielectric (JFD)(VC20G) . . . . (ATTACHING PARTS)	1
-119B	—	. . NUT, Hexagon, No. 10-32 thd (supplied with item 119A, . . Figure 4)	1
-119C	8489	. . WASHER, Lock, sst, 0.199 ID by 0.375 OD by 0.039 in. thk . (SH)(1710)	1
		- - - * - - -	
-120	200(220)	. . RESISTOR, Fixed, comp, 220 ohms ±10 per cent, 1/4 w . . (AB)(CB2211)	2

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-121	8870(51)	. . CAPACITOR, Fixed, mica, 51 μμf ±5 per cent, 500 vdcw (EMM)(VTDM-15-51)	2
-122	200(33K)	. . RESISTOR, Fixed, comp, 33,000 ohms ±10 per cent, 1/4w (AB)(CB3331)	1
-123	204(10)	. . RESISTOR, Fixed, comp, 10 ohms ±10 per cent, 1/4w (GBR)(997CX10)	1
-124	8877(3.3)	. . CHOKE, RF, 3.3 μh ±10 per cent (JFE)(10102-620)	1
-125	201(3300)	. . RESISTOR, Fixed, comp, 3300 ohms ±5 per cent, 1/2w (AB)(EB3325)	1
-126	700(136)	. . ELECTRON TUBE, Type 6021	1
-127	19883	. . PLATE.	1
-128	8870(100)	. CAPACITOR, Fixed, mica, 100 μμf ±5 per cent, 500 vdcw (EMM)(VTDM-15-100)	1
-129	8765(7)	. CAPACITOR, Fixed, ceramic, 7 μμf ±0.25 μμf, 500 vdcw, MIL type CC20HH070C	1
-130	19920	. COIL, RF.	1
-131	19923	. COIL, RF.	1
-132	19929	. CAPACITOR, Variable, air dielectric (ATTACHING PARTS)	1
-133	104(3/16)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 3/16 in. lg - - - * - - -	2
-134	14143	. CAPACITOR, Fixed, ceramic, 1000 μμf ±20 per cent, 500 vdcw (ERC)(357) (ATTACHING PARTS)	2
-135	—	. NUT, Hexagon, 12-28 thd (supplied with 134, Figure 4)	2
-136	21319	. WASHER, Lock, ph brz, ni pl, 0.226 ID by 0.400 OD by 0.022 in. thk - - - * - - -	2
	19874	. PLATE ASSEMBLY, Mixer. (ATTACHING PARTS)	1
-137	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS) - - - * - - -	2
-138	8870(51)	. . CAPACITOR, Fixed, mica, 51 μμf ±5 per cent, 500 vdcw (EMM)(VTDM-15-51)	1
-139	201(680)	. . RESISTOR, Fixed, comp, 680 ohms ±5 per cent, 1/2w (AB)(EB6815)	1
-140	201(150K)	. . RESISTOR, Fixed, comp, 150,000 ohms ±5 per cent, 1/2w (AB)(EB1545)	1
-141	8832	. . CAPACITOR, Fixed, ceramic, 1000 μμf ±20 per cent, 500 vdcw (SLM)(CF-100-2-1022)	2
-142	201(100K)	. . RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w (AB)(EB1045)	1
-143	700(132)	. . ELECTRON TUBE, Type 5899	1
-144	19873	. . PLATE.	1
-145	8877(15)	. CHOKE, 15 μh ±10 per cent (JFE)(10102-636)	1
-146	19897	. CAPACITOR, Variable, air dielectric (ATTACHING PARTS)	1
-147	503(3/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, 3-48 thd by 3/16 in. lg (SH)(SEMS)	1
-148	103(5/32)	. SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 5/32 in. lg - - - * - - -	1
-149	8363	. CAPACITOR, Fixed, ceramic, 15 μμf ±5 per cent (CN) (type D-15)	1
-150	8879(0.39)	. CAPACITOR, Fixed, electrolytic, 0.39 μμf ±5 per cent, 500 vdcw (STL)(GA)	1
-151	200(47)	. RESISTOR, Fixed, comp, 47 ohms ±10 per cent, 1/4w (AB)(CB4701)	1
-152	8541	. CAPACITOR, Fixed, ceramic, 100 μμf ±2 per cent (CN)(type D-100)	1
-153	19921	. COIL.	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-154	19922	. COIL.	1
-155	19929	. CAPACITOR, Variable.	1
		(ATTACHING PARTS)	
-156	504(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-157	14143	. CAPACITOR, Fixed, ceramic, 1000 μf ±20 per cent, 500 vdcw (ERC)(357)	4
		(ATTACHING PARTS)	
-158	—	. NUT, Hexagon, 12-28 thd (supplied with 157, Figure 4)	4
-159	21319	. WASHER, Lock, ph brz, ni pl, 0.226 ID by 0.400 OD by 0.022 in. thk	4
		- - - * - - -	
	19887	. PLATE ASSEMBLY, Cascode	1
		(ATTACHING PARTS)	
-160	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
		- - - * - - -	
-161	8832	. . CAPACITOR, Fixed, ceramic, 1000 μμf ±20 per cent, 500 vdcw (SLM)(CF-100-2-1022)	2
-162	700(122)	. . ELECTRON TUBE, Type 5718	2
-163	201(470K)	. . RESISTOR, Fixed, comp, 470,000 ohms ±5 per cent, 1/2w (AB)(EB4745)	2
-164	8877(0.22)	. . CHOKE, 0.22 μh ±20 per cent (JFE)(10100-622).	1
-165	201(100K)	. . RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w (AB)(EB1045)	1
-166	201(100)	. . RESISTOR, Fixed, comp, 100 ohms ±5 per cent, 1/2w (AB)(EB1015)	1
-167	19888	. . PLATE.	1
-168	8765(10)	. CAPACITOR, Fixed, ceramic, 10 μμf ±0.25 per cent, 500 vdcw, MIL type CC20HG100C	1
-169	8363	. CAPACITOR, Fixed, ceramic, 15 μμf ±5 per cent (CN)(D-15)	1
-170	19924	. COIL.	1
-171	19929	. CAPACITOR, Variable, air dielectric	1
		(ATTACHING PARTS)	
-172	504(7/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-173	20301	. CABLE ASSEMBLY, Antenna	1
		(ATTACHING PARTS)	
-174	—	. NUT, Hexagon, brs, silver pl, 1/4-32 thd (supplied with 173, Figure 4)	1
-175	8661	. WASHER, Lock, sst, 0.261 ID by 0.402 OD by 0.018 in. thk (SH)(1714-05)	1
		- - - * - - -	
-176	19676	. PLATE	1
		(ATTACHING PARTS)	
-177	104(7/32)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 7/32 in. lg	1
		- - - * - - -	
-178	19419	. BEARING.	4
		(ATTACHING PARTS)	
-179	304(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 1/8 in. lg	4
		- - - * - - -	
	19940	. PLATE ASSEMBLY, Tuner.	1
-180	15453	. . TERMINAL, Stud	2
		(ATTACHING PARTS)	
-181	504(3/16)	. . SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 3/16 in. lg (SH)(SEMS)	2
		- - - * - - -	
-182	—	. . PLATE, c/o bearing 13749, washer 4550, and plate 19941	1

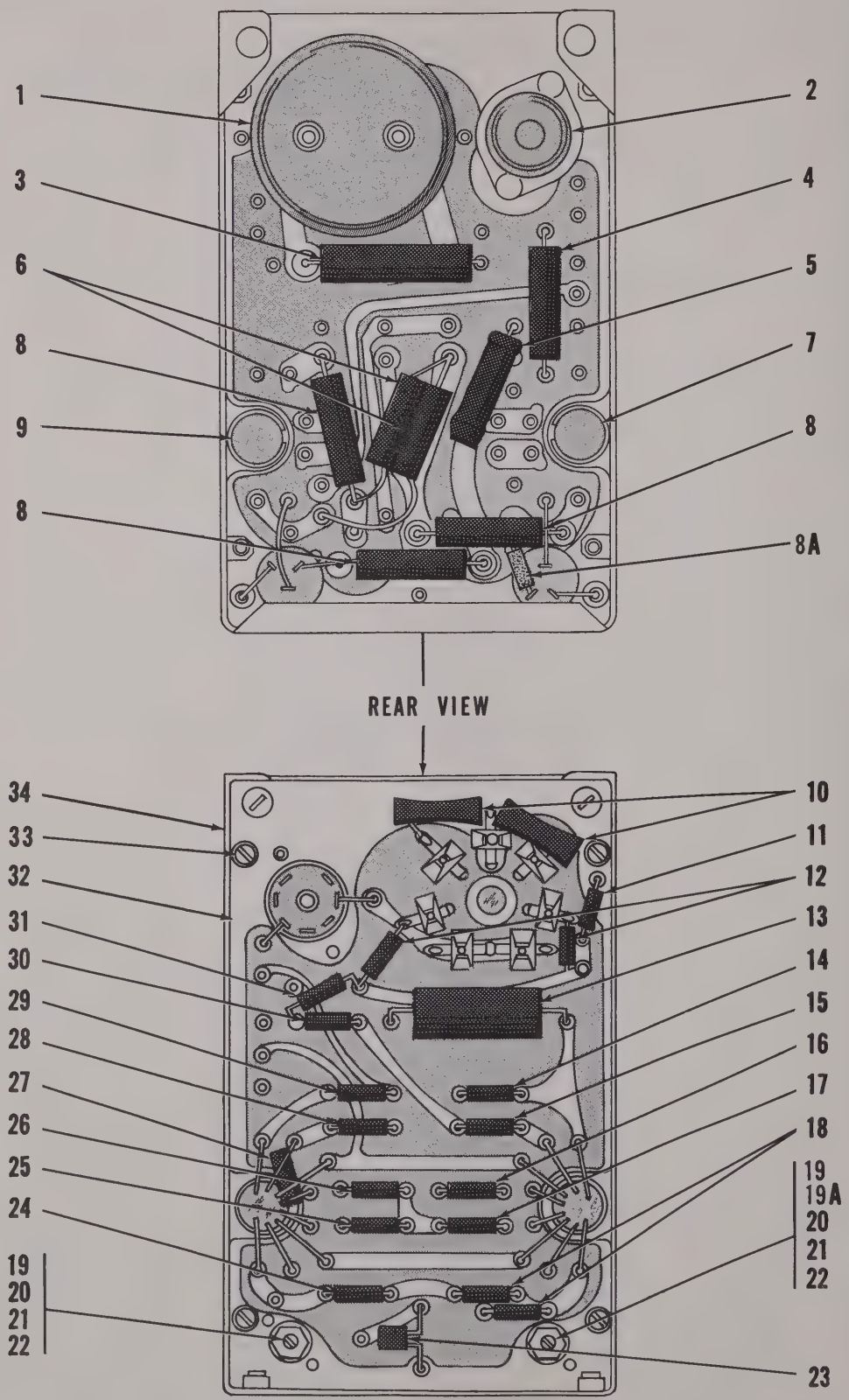
Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-183	19626	. SPRING, Helical, extension	1
-184	14785	. SPRING, Helical, extension	2
-185	4023	. TERMINAL, Lug (SH)(2522-6-1)	3
-186	19467	. ARM	3
-187	19645	. BLOCK	3
		(ATTACHING PARTS)	
-188	304(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 1/8 in. lg	3
		- - - * - - -	
-189	20947	. CAM ASSEMBLY	1
		(ATTACHING PARTS)	
-190	306(1/8)	. SETSCREW, Fluted socket dr, cup point, sst, 6-32 thd by 1/8 in. lg	2
		- - - * - - -	
-191	21482	. SHAFT	1
-192	20620	. BEARING, Ball (ND)(SSRS77NR3HGZD1228E)	1
		(ATTACHING PARTS)	
-193	20625	. RING, Retaining (WKI)(5101-56-W)	1
-194	21322	. WASHER, Flat, al aly, 0.565 ID by 0.781 OD by 0.032 in. thk	1
		- - - * - - -	
-195	19934	. LEVER ASSEMBLY	1
		(ATTACHING PARTS)	
-196	17326	. RING, Retaining (WKI) (5133-12-C-MF)	1
		- - - * - - -	
-197	19975	. PLATE	1
		(ATTACHING PARTS)	
-198	504(9/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 9/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
	20369	. FRAME ASSEMBLY	1
-199	8837	. . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1GS-10)	10
		(ATTACHING PARTS)	
-200	4561	. . NUT, Hexagon, brs, ni pl, 3-48 thd by 0.062 in. thk	10
-201	4103	. . WASHER, Lock, sst, 0.105 ID by 0.220 OD by 0.025. in. thk (SH)(1703)	10
		- - - * - - -	
-202	19933	. . BRACKET	1
		(ATTACHING PARTS)	
-203	503(1/4)	. . SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
		- - - * - - -	
-204	21485(1)	. . CAPACITOR, Fixed, electrolytic, 1.0 μf ±20 per cent, 35 vdcw (SPR)(150D268B1)	1
	19979	. . PANEL ASSEMBLY	1
		(ATTACHING PARTS)	
-205	103(1/4)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg	4
-206	10353	. . WASHER, Spring tension	4
		- - - * - - -	
-207	201(470)	. . . RESISTOR, Fixed, comp, 470 ohms ±5 per cent, 1/2w (AB)(EB4715)	2
-208	201(100K)	. . . RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w (AB)(EB1045)	4
-209	201(15K)	. . . RESISTOR, Fixed, comp, 15,000 ohms ±5 per cent, 1/2w (AB)(EB1535)	3
-210	201(680)	. . . RESISTOR, Fixed, comp, 680 ohms ±5 per cent, 1/2w (AB)(EB6815)	1
-210A	8964(1K)	. . . RESISTOR, Variable, comp, 1000 ohms ±20 per cent, 1/4w (AB)(type R)	1
-210B	201(33K)	. . . RESISTOR, Fixed, comp, 33,000 ohms ±5 per cent, 1/2w (AB)(EB3335)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-211	19978	. . . PANEL	1
-212	21248	. . TRANSFORMER, IF.	1
		(ATTACHING PARTS)	
-213	502(7/32)	. . SCREW, Assembled washer, bind hd, brs screw, sst . . . lockwasher, ni pl, 2-56 thd by 7/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-214	700(132)	. . ELECTRON TUBE (type 5899)	3
-214A	700-0129	. . ELECTRON TUBE (type 5840)	1
-215	19968	. . TRANSFORMER, IF.	2
		(ATTACHING PARTS)	
-216	502(7/32)	. . SCREW, Assembled washer, bind hd, brs screw, sst . . . lockwasher, ni pl, 2-56 thd by 7/32 in. lg (SH)(SEMS)	4
		- - - * - - -	
	19959	. . PLATE.	1
		(ATTACHING PARTS)	
-217	503(1/4)	. . SCREW, Assembled washer, bind hd, brs screw, sst . . . lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
-218	103(1/4)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg .	2
-219	10353	. . WASHER, Spring tension.	2
		- - - * - - -	
	20395	. . PANEL ASSEMBLY	1
		(ATTACHING PARTS)	
-220	103(1/4)	. . SCREW, Machine, bind hd, brs, ni pl, 3-48 thd by 1/4 in. lg .	2
-221	10353	. . WASHER, Spring tension.	2
		- - - * - - -	
-222	200(1.5MEG)	. . . RESISTOR, Fixed, comp, 1.5 megohms ±10 per cent, . 1/4w (AB)(CB1551)	1
-222A	200(1MEG)	. . . RESISTOR, Fixed, comp, 1 megohm ±10 per cent, . . . 1/4w (AB)(CB1051)	1
-223	17633	. . . SEMICONDUCTOR DEVICE, Diode, type 1N462	4
-223A	23037	. . . SEMICONDUCTOR DEVICE, Diode (HUG)(HD6226) . . .	4
-224	202(270)	. . . RESISTOR, Fixed, comp, 270 ohms ±5 per cent, ... 1w (AB)(GB2715)	1
-225	201(470K)	. . . RESISTOR, Fixed, comp, 470,000 ohms ±5 per cent, . . . 1/2w (AB)(EB4745)	3
-226	200(1MEG)	. . . RESISTOR, Fixed, comp, 1.5 megohms ±10 per cent, 1/4w (AB)(CB1051)	1
-227	201(47K)	. . . RESISTOR, Fixed, comp, 47,000 ohms ±5 per cent, . . . 1/2w (AB)(EB4735)	1
-228	201(680K)	. . . RESISTOR, Fixed, comp, 680,000 ohms ±5 per cent, . . . 1/2w (AB)(EB6845)	1
-229	201(2MEG)	. . . RESISTOR, Fixed, comp, 2 megohms ±5 per cent, ... 1/2w (AB)(EB2055)	1
-230	201(1MEG)	. . . RESISTOR, Fixed, comp, 1 megohm ±5 per cent, ... 1/2w (AB)(EB1055)	4
-231	17953	. . . SEMICONDUCTOR DEVICE, Diode, type 1N459	1
-232	201(1.5MEG)	. . . RESISTOR, Fixed, comp, 1.5 megohms ±5 per cent, . . . 1/2w (AB)(EB1555)	2
-233	201(10K)	. . . RESISTOR, Fixed, comp, 10,000 ohms ±5 per cent, . . . 1/2w (AB)(EB1035)	1
-234	201(470)	. . . RESISTOR, Fixed, comp, 470 ohms ±5 per cent, 1/2w . . (AB)(EB4715)	1
-235	21485(1)	. . . CAPACITOR, Fixed, electrolytic, 1 μf ±20 per cent, . . . 35 vdcw (SPR)(150D268B1)	2
-236	17953	. . . SEMICONDUCTOR DEVICE, Diode, type 1N459 . . . . . (used beginning with M-7)	1
-236A	23037	. . . SEMICONDUCTOR DEVICE, Diode (HUG)(HD6226)	1
-237	201(330K)	. . . RESISTOR, Fixed, comp, 330,000 ohms ±5 per cent, . . . 1/2w (AB)(EB3345)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
4-237	201(150K)	. . . RESISTOR, Fixed, comp, 150,000 ohms ±5 per cent, . . . 1/2w (AB)(EB1545)(value change beginning with M-8)	1
-237A	201(220K)	. . . RESISTOR, Fixed, comp, 220,000 ohms ±5 per cent, . . . 1/2w (AB)(EB2245)	1
-238	201(22K)	. . . RESISTOR, Fixed, comp, 22,000 ohms ±5 per cent, . . . 1/2w (AB)(EB2235)	1
-239	201(100K)	. . . RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, . . . 1/2w (AB)(EB1045)	1
-240	201(82K)	. . . RESISTOR, Fixed, comp, 82,000 ohms ±5 per cent, . . . 1/2w (AB)(EB8235)	1
-240	201(27K)	. . . RESISTOR, Fixed, comp, 27,000 ohms ±5 per cent, . . . 1/2w (AB)(EB2735)(value change beginning with M-8)	1
-241	8464	. . . CAPACITOR, Fixed, ceramic, 1000 μμf, 500 vdcw (CN) . (BU20-102N-Y5Y)	1
-241	8870(51)	. . . CAPACITOR, Fixed, mica, 51 μμf ±5 per cent, 500 vdcw . (EMM)(VTDM-15-51)(value change beginning with M-8)	1
-242	201(82K)	. . . RESISTOR, Fixed, comp, 82,000 ohms ±5 per cent, . . . 1/2 w (AB)(EB8235)	1
-243	8837	. . . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 . vdcw (CLD)(TWA3S1GS-10)	7
-244	201(1MEG)	. . . RESISTOR, Fixed, comp, 1 megohm ±5 per cent, . . . 1/2w (AB)(EB1055)	2
-245	21975	. . . CAPACITOR, Fixed, plastic, 0.047 μf ±20 per cent, . . . 50 vdcw (CLD)(TWM104)	1
-246	8535	. . . CAPACITOR, Fixed, ceramic, 250 μμf ±20 per cent, . . . 500 vdcw (CN)(BC type A)	1
-246	8908(2200)	. . . CAPACITOR, Fixed, mica, 2200 μμf ±5 per cent, 500 . vdcw (EMM)(VTDM-19-2200)(value change beginning with M-8)	1
-247	[1]21965	. . . CAPACITOR, Fixed, plastic, 0.047 μf ±20 per cent, 50 . vdcw (CLD)(TWM104)(used in M-1 through M-7 units)	1
-247	[1]21485	. . . CAPACITOR, Fixed, electrolytic, 0.15 μf ±20 per cent, . 35 vdcw (SPR)(150D154X0035A2)(value change beginning with M-7)	1
-248	201(2.2MEG)	. . . RESISTOR, Fixed, comp, 2.2 megohms ±5 per cent, . . . 1/2w (AB)(EB2255)	1
-249	201(470K)	. . . RESISTOR, Fixed, comp, 470,000 ohms ±5 per cent, . . . 1/2w (AB)(EB4745)	2
-250	8626(4700)	. . . CAPACITOR, Fixed, ceramic, 4700 μμf ±20 per cent, . 500 vdcw (AB)(DS36-472W)	1
-251	8835	. . . CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 . vdcw (CLD)(TWA3S1-10)	1
-252	8870(100)	. . . CAPACITOR, Fixed, mica, 100 μμf ±5 per cent, 500 . . . vdcw (EMM)(VTDM-15-100)	1
-253	20396	. . . PANEL, Printed circuit	1
-254	8777	. . CAPACITOR, Fixed, electrolytic, 12 μf +75 -15 per cent, . 150 vdcw (SPR)(110D47)	1
-255	8890(0.022)	. . CAPACITOR, Fixed, paper, 0.022 μf ±20 per cent, 200 . . . vdcw (SPR)(196P22302S4)	1
-255	8835(0.01)	. . CAPACITOR, Fixed, plastic, 0.01 μf ±20 per cent, 300 . . . vdcw (CLD)(TWA3S1-10)(value change beginning with M-7)	1
-256	700(133)	. . ELECTRON TUBE, Type 5902	1
-257	19955	. . PLATE.	1
		(ATTACHING PARTS)	
-258	503(1/4)	. . SCREW, Assembled washer, bind hd, brs screw, sst . . . lockwasher, ni pl, ,3-48 thd by 1/4 in. lg (SH)(SEMS)	2
		- - - * - - -	
-259	20679	. . TRANSFORMER.	1
-260	700(131)	. . ELECTRON TUBE, Type 5896	1
-261	700(139)	. . ELECTRON TUBE, Type 6112	1

[1]In early M-7 units a 0.1-μf capacitor was used with a 0.47-μf capacitor to obtain the value of 0.15 μf; in later M-7 units and higher these capacitors were replaced with ARC-21485.

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
-262	19961	. . PLATE.	1
		(ATTACHING PARTS)	
-263	503(1/4)	. . SCREW, Assembled washer, bind hd, brs screw, sst . . . lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	2
		- - - * - - -	
-264	19954	. . PLATE.	1



TP1611A

Figure 5. Modulator Assembly

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
5-	20360	MODULATOR ASSEMBLY (see 18, Figure 2)	Ref
-1	700(143)	. ELECTRON TUBE, Type 6850	1
-2	700(103)	. ELECTRON TUBE, Type 0B2A	1
-3	8836	. CAPACITOR, Fixed, paper, 0.047 μf ±20 per cent, 300 vdcw (CLD)(TWA3S47-10)	1
-4	8835	. CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1-10)	1
-5	8797(200)	. CAPACITOR, Fixed, ceramic, 200 μμf ±5 per cent, 500 vdcw .	1
-6	8617(1000)	. CAPACITOR, Fixed, mica, 1000 μμf ±2 per cent, 500 vdcw (EMM)(type VTCM20) .	1
-7	700(136)	. ELECTRON TUBE, Type 6021	1
-8	8835	. CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw (CLD)(TWA3S1-10)	3
-8A	200(330K)	. RESISTOR, Fixed, comp, 330,000 ohms ±10 per cent, 1/4w (AB)(CB3341)	1
-9	700(136)	. ELECTRON TUBE, Type 6021	1
-10	8796(120)	. CAPACITOR, Fixed, ceramic, 120 μμf ±5 per cent, 500 vdcw .	2
-11	201(27K)	. RESISTOR, Fixed, comp, 27,000 ohms ±5 per cent, 1/2w (AB)(EB2735)	1
-12	201(100K)	. RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w (AB)(EB1045)	2
-13	8836	. CAPACITOR, Fixed, paper, 0.047 μf ±20 per cent, 3 vdcw (CLD)(TWA3S47-10)	1
-14	201(47K)	. RESISTOR, Fixed, comp, 47,000 ohms ±5 per cent (AB) (EB4735) . . .	1
-15	201(1MEG)	. RESISTOR, Fixed, comp, 1 megohm ±5 per cent (AB). (EB1055)	1
-16	201(2200)	. RESISTOR, Fixed, comp, 2200 ohms ±5 per cent, 1/2w (AB)(EB2225) . . .	1
-17	201(1K)	. RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, 1/2w (AB)(EB1025) . . .	1
-18	201(47K)	. RESISTOR, Fixed, comp, 47,000 ohms ±5 per cent (AB) (EB4735) . .	2
-19	8826	. RESISTOR, Variable, comp, 0 to 500,000 ohms ±20 per cent (AB)(GLU5042SD3028L) .	2
-19A	8915(100K)	. RESISTOR, Variable, comp, 0-100,000 ohms ±20 per cent, 1/2w (AB)(GLU1042SD3028L) .	1
		(ATTACHING PARTS)	
-20	—	. NUT, Hexagon, sst, 1/4-32 thd by 11/64 in. thk (AB)(M4761) .	2
-21	—	. NUT, Plain, hex, sst, 1/4-32 thd by 0.078 in. thk (AB)(M4721)	2
-22	—	. WASHER, Lock, sst, 0.250 ID by 0.402 OD by 0.018 in. dia (AB)(M4748) . . .	2
		- - - * - - -	
-23	8874(7V)	. SEMICONDUCTOR DEVICE, Diode, silicon (TI)(653C4) . . .	1
-24	201(100K)	. RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w (AB)(EB1045)	1
-25	201(1600)	. RESISTOR, Fixed, comp, 1600 ohms ±5 per cent, 1/2w (AB) (EB1625) .	1
-26	201(2200)	. RESISTOR, Fixed, comp, 2200 ohms ±5 per cent, 1/2w (AB) (EB2225) .	1
-27	8870(51)	. CAPACITOR, Fixed, mica, 51 μμf ±5 per cent, 500 vdcw . . . (EMM)(VTDM-15-51)	1
-28	201(220K)	. RESISTOR, Fixed, comp, 220,000 ohms ±5 per cent, 1/2w. . . (AB)(EB2245)	1
-29	201(100K)	. RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w. . . (AB)(EB1045)	1
-30	201(47K)	. RESISTOR, Fixed, comp, 47,000 ohms ±5 per cent, 1/2w . . . (AB)(EB4735)	1
-31	201(100K)	. RESISTOR, Fixed, comp, 100,000 ohms ±5 per cent, 1/2w. . . (AB)(EB1045)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
5-32	20362	. PANEL, Printed circuit	1
		(ATTACHING PARTS)	
-33	503(5/16)	. SCREW, Assembled washer, bind hd, brs screw, sst	4
		lockwasher, ni pl, 3-48 thd by 5/16 in. lg (SH)(SEMS)	
		- - - * - - -	
-34	19725	. BRACKET, Modulator	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
6-	19302(14V)	CHASSIS ASSEMBLY (14V)(see 20, Figure 2)	Ref
6-	19302(28V)	CHASSIS ASSEMBLY (28V)(see 20, Figure 2)	Ref
-1	19896	. RELAY ASSEMBLY (14V)	1
-1	19315	. RELAY ASSEMBLY (28V)	1
		(ATTACHING PARTS)	
-2	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	4
-3	19318	. . CONNECTOR, Receptacle, electrical	1
-4	200(4700)	. RESISTOR, Fixed, comp, 4700 ohms ±10 per cent, 1/4w . . . (AB)(CB4711)	1
-5	200(10K)	. RESISTOR, Fixed, comp, 10,000 ohms ±10 per cent . . . . . 1/4w (AB)(CB1031)	1
-6	200(100K)	. RESISTOR, Fixed, comp, 100,000 ohms ±10 per cent, ... (AB)(CB1041)	1
-7	19663	. SEMICONDUCTOR DEVICE, Diode, type 1N90	1
-8	19662	. RELAY, 4 pdt (GE)(CR2791G121A43)(14V)	1
-8	17635	. RELAY, 4 pdt (GE)(3S2791G1212A41)(28V)	1
		(ATTACHING PARTS)	
-9	4041	. NUT, Hexagon, brs, ni pl, 6-32 thd by 0.078 in. thk	3
-10	7742	. TERMINAL, Lug (SH)(2153-6)	3
-11	8488	. WASHER, Lock, sst, 0.145 ID by 0.280 OD by 0.018 in. thk .	3
		- - - * - - -	
-12	8627(0.022)	. CAPACITOR, Fixed, ceramic, 0.022 μf ±20 per cent, ... 500 vdcw (AB)(40-223W)	1
-13	19345	. TRANSFORMER, Modulation (CMPB)(1942B)	1
		(ATTACHING PARTS)	
-14	504(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 4-40 thd by 1/4 in. lg (SH)(SEMS)	4
		- - - * - - -	
-15	19339	. CONNECTOR, Plug, electrical	3
-16	19342	. CONNECTOR, Plug, electrical	1
-17	19334	. PLATE	1
		(ATTACHING PARTS)	
-18	504(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 4-40 thd by 1/4 in. lg (SH)(SEMS)	7
-19	503(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 3-48 thd by 1/4 in. lg (SH)(SEMS)	10
-20	506(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 6-32 thd by 1/4 in. lg (SH)(SEMS)	1
-21	21328	. STUD, Threaded	2
		- - - * - - -	
-22	12970	. GROMMET, Rubber, (GOS)(614)	5
-23	20666	. CAPACITOR, Fixed, ceramic, 470 μμf ±20 per cent, 500 . . . vdcw (ERC)(357)	1
		(ATTACHING PARTS)	
-24	—	. NUT, Hexagon, brs, cad pl, 12-28 thd by 3/32 in. thk. . . . . (supplied with 23, Figure 6)	1
-25	8486	. WASHER, Lock, sst, 0.226 ID by 0.400 OD by 0.022 in. . . . thk (SH)(1712)	1
		- - - * - - -	
-26	209(126)	. RESISTOR, Fixed, WW, 126 ohms ±3 per cent, 3w . . . . . (DABU)(RS-2-126)	1
-27	19326	. PLATE	1
		(ATTACHING PARTS)	
-28	504(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 4-40 thd by 1/4 in. lg (SH)(SEMS)	5
-29	104(1/4)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 1/4 in. lg .	2
-30	8497	. WASHER, Lock sst, 0.119 ID by 0.260 OD by 0.016 in. thk. . .	2
-31	7710	. TERMINAL, Lug	1
-32	13039	. TERMINAL, Lug	1
		- - - * - - -	

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
6-33	8756	. CAPACITOR, Fixed, paper, 470,000 μμf ±20 per cent, 400 vdcw (SPR)(186P47404T15)	1
		(ATTACHING PARTS)	
-34	—	. NUT, Hexagon, 5/16-24 thd (SPR)(6-113)(supplied with 33, Figure 6)	1
-35	—	. WASHER, Lock (SPR)(2-47)(supplied with 33, Figure 6)	1
		- - - * - - -	
-36	201(6800)	. RESISTOR, Fixed, comp, 6800 ohms ±5 per cent, 1/2w (AB)(EB6825)(used beginning with M-8)	1
-36A	201(6200)	. RESISTOR, Fixed, comp, 6200 ohms ±5 per cent, 1/2w (AB)(EB6225)	1
-37	8682	. RESISTOR, Variable, comp, 0tto 50,000 ohms ±20 per cent, 0.33w (AB)(GLB5032SD3028L)	1
-37A	8937(50K)	. RESISTOR, Variable, comp, 0 to 50,000 ohms ±20 per cent, 0.33w (AB)(GLB5032SD3028L)	1
		(ATTACHING PARTS)	
-38	—	. NUT, Lock, sst, 1/4-32 thd by 11/64 in. thk (AB)(M4761)	1
-39	—	. NUT, Hexagon, sst, 1/4-32 thd by 0.078 in. thk (AB)(M4721)	1
-40	—	. WASHER, Lock, sst, 0.250 ID by 0.402 OD by 0.018 in. thk (AB)(M4748)	1
		- - - * - - -	
-41	203(15K)	. RESISTOR, Fixed, comp, 15,000 ohms ±5 per cent, 2w (AB)(HB1535)	1
-42	209(126)	. RESISTOR, Fixed, WW, 126 ohms ±3 per cent, 3w (DABU)(RS-2-126)	1
-43	209(3)	. RESISTOR, Fixed, WW, 3 ohms ±3 per cent, 3w (DABU) (RS-2-3)	1
-44	203(6800)	. RESISTOR, Fixed, comp, 6800 ohms ±5 per cent, 2w (AB)(HB6825)	1
-45	203(1K)	. RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, 2w (AB)(HB1025)	1
-46	8796(120)	. CAPACITOR, Fixed, ceramic, 120 μμf ±5 per cent, 500 vdcw	2
-47	203(4700)	. RESISTOR, Fixed, comp, 4700 ohms ±5 per cent, 2w (AB)(HB4725)	2
-48	210(9700)	. RESISTOR, Fixed, WW, 9700 ohms ±3 per cent, 5w (DABU)(RSE-5-9.7)	1
-49	8627(0.022)	. CAPACITOR, Fixed, ceramic, 0.022 μf ±20 per cent, 500 vdcw (AB)(40-223W)	2
-49A	24541(150)	. CAPACITOR, Fixed, ceramic, 150 μμf ±20 per cent, 500 vdcw (used in units beginning with M-9)	1
-50	201(220)	. RESISTOR, Fixed, comp, 220 ohms ±5 per cent, 1/2w (AB)(EB2215)	1
-51	201(110)	. RESISTOR, Fixed, comp, 110 ohms ±5 per cent, 1/2w (AB)(EB1115)	2
-52	21327	. PLATE	1
		(ATTACHING PARTS)	
-53	504(7/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 7/16 in. lg (SH)(SEMS)	3
		- - - * - - -	
-54	8780	. CAPACITOR, Fixed, tantalum, 60 μf +50 -15 per cent, 50 vdcw (CW39D061KSP)	2
-54A	23943	. CAPACITOR, Fixed, electrolytic, 60 μf +75 -15 per cent, 50 vdcw (FML)(F310)	2
-55	13886	. HANDLE	1
		(ATTACHING PARTS)	
-56	509(1/2)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 10-32 thd by 1/2 in. lg (SH)(SEMS)	2
-57	21758	. WASHER, Flat	1
		- - - * - - -	
-58	20407	. BRACKET	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
		(ATTACHING PARTS)	
6-59	508(3/8)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 8-32 thd by 3/8 in. lg (SH)(SEMS)	2
-60	168(5/16)	. SCREW, Machine, fil hd, brs, ni pl, 8-32 thd by 5/16 in. lg .	2
		- - - * - - -	
-61	19304	. BASE	1
-62	20814	. PLATE, Identification (14V)	1
-62	20815	. PLATE, Identification (28V)	1
		(ATTACHING PARTS)	
-63	8081	. SCREW, Tapping, thread forming, rh, Phillips dr, stl, blk . . parkerized, No. 2 by 5/32 in. lg (PK)(Z)	2
		- - - * - - -	
-64	24173	. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PARTS)	
-65	5310	. NUT, Knurled (supplied with 64, Figure 6)	1
		- - - * - - -	
-66	14100	. EMBLEM.	1
		(ATTACHING PARTS)	
-67	8040	. NUT, Hexagon, brs, ni pl, 4-40 thd by 0.062 in. thk	1
-68	7730	. WASHER, Spring tension	1
		- - - * - - -	
-69	8682	. RESISTOR, Variable, comp, 0 to 50,000 ohms ±20 per cent, . 0.33w (AB)(GLB5032SD3028L)	1
-69A	8937(50K)	. RESISTOR, Variable, comp, 0-50,000 ohms ±20 per cent, . . . 0.33w (AB)(GLB5032SD3028L)	1
		(ATTACHING PARTS)	
-70	—	. NUT, Lock, sst, 1/4-32 thd by 11/64 in. thk (AB)(M4761) . . .	1
-71	—	. NUT, Hexagon, sst, 1/4-32 thd by 0.078 in. thk (AB)(M4721) .	1
-72	—	. WASHER, Lock, sst, 0.250 ID by 0.402 OD by 0.018 in. thk . . (AB)(M4748)	1
		- - - * - - -	
-73	8835	. CAPACITOR, Fixed, paper, 0.01 μf ±20 per cent, 300 vdcw . (CLD)(TWA3S1-10)	1
-74	8826	. RESISTOR, Variable, comp, 0 to 500,000 ohms ±20 per cent, . 0.33w (AB)(GLU5042SD3028L)	1
-74A	8915(500K)	. RESISTOR, Variable, comp, 0-500,000 ohms ±20 per cent, . . 1/2w (AB)(GLU5042SD3028L)	1
		(ATTACHING PARTS)	
-75	—	. NUT, Lock, sst, 1/4-32 thd by 11/64 in. thk (AB)(M4761) . . .	1
-76	—	. NUT, Hexagon, sst, 1/4-32 thd by 0.078 in. thk (AB)(M4721) .	1
-77	—	. WASHER, Lock, sst, 0.250 ID by 0.402 OD by 0.018 in. thk . . (AB)(M4748)	1
		- - - * - - -	
-78	8627(0.022)	. CAPACITOR, Fixed, ceramic, 0.022 μf ±20 per cent, 500 vdcw (AB)(40-223W)	1
-79	7565	. JACK, Telephone	1
		(ATTACHING PARTS)	
-80	4697	. NUT, Knurled, brs, ni pl, 3/8-32 thd by 0.094 in. thk	1
-81	12517	. WASHER, Flat, brs, ni pl, 0.380 ID by 0.500 OD by 0.020 in. thk .	1
		- - - * - - -	
-82	201(220K)	. RESISTOR, Fixed, comp, 220,000 ohms ±5 per cent, 1/2w . . (AB)(EB2245)	1
-82	203(47K)	. RESISTOR, Fixed, comp, 47,000 ohms ±5 per cent, 2w (AB) . (HB4735)(used beginning with M-8)	1
-83	9391	. JACK, Microphone	1
		(ATTACHING PARTS)	
-84	4697	. NUT, Round, brs, ni pl, 3/8-32 thd by 0.094 in. thk	1
-85	12517	. WASHER, Flat, brs, ni pl, 0.380 ID by 0.500 OD by 0.020 in. thk	1
		- - - * - - -	
-85A	24541(150)	. CAPACITOR, Fixed, ceramic, 150 μμf ±20 per cent, ... 500 vdcw (used in units beginning with M-9)	4
-85B	23037	. SEMICONDUCTOR DEVICE, Diode (HUG)(HD6226)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
6-86	12355	. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PARTS)	
-87	5131	. NUT, Knurled (supplied with 86, Figure 6)	1
		- - - * - - -	
-88	8683	. RESISTOR, Voltage sensitive (GE)(866B191G3)	1
-89	8627(0.022)	. CAPACITOR, Fixed, ceramic, 0.022 μf ±20 per cent, 500. . . vdcw (AB)(40-223W)(used in units beginning with M-9)	1
-89A	24541(150)	. CAPACITOR, Fixed, ceramic, 150 μμf ±20 per cent, ... 500 vdcw (used in units beginning with M-9)	4
-89B	8627(.01)	. CAPACITOR, Fixed, ceramic, 0.01 μf ±20 per cent, ... 500 vdcw (used in units beginning with M-9)	2
-90	12348	. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PARTS)	
-91	5131	. NUT, Knurled (supplied with 90, Figure 6)	1
		- - - * - - -	
-92	20811	. CABLE ASSEMBLY	1
-93	20812	. CABLE ASSEMBLY	1
-93A	24543	. CABLE ASSEMBLY (used in units beginning with M-9).	1
-94	19313	. PLATE, Front	1

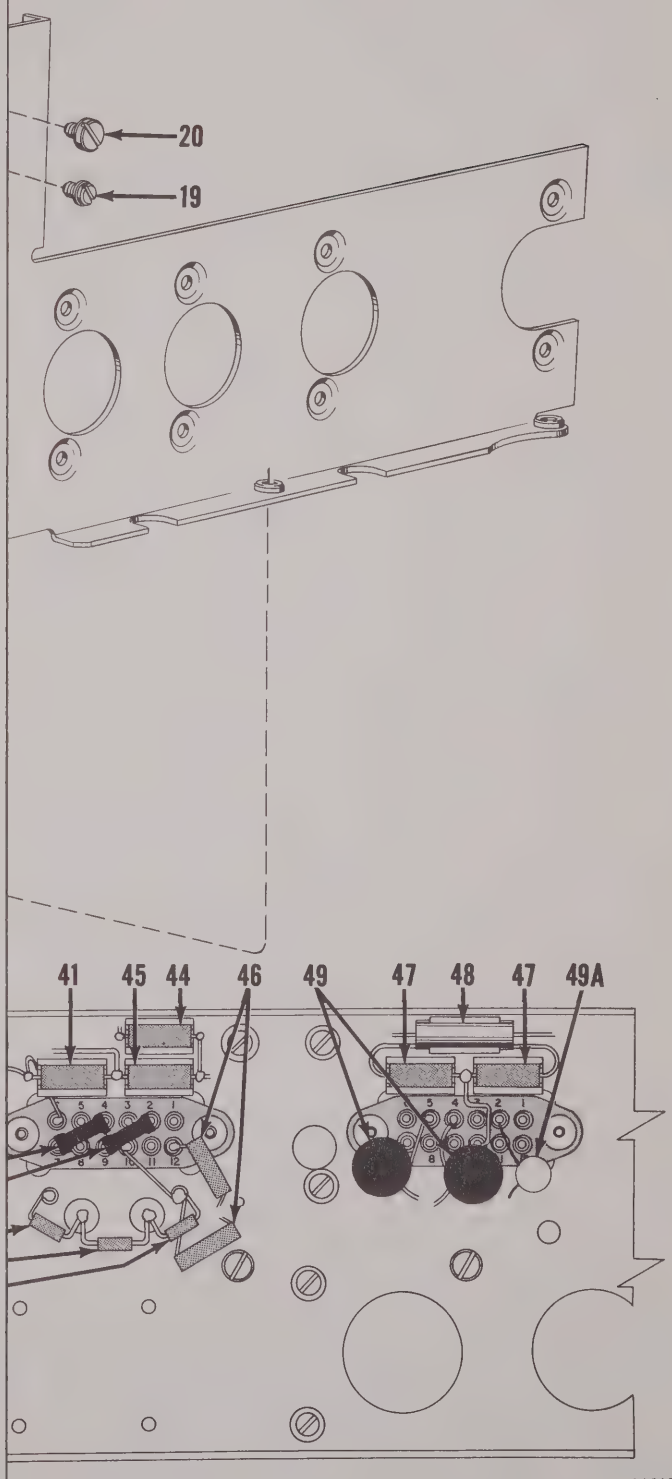


Figure 6. Chassis Assembly

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
6-86	12355	. CONNECTOR, Receptacle, electrical . . . . . (ATTACHING PARTS)	1
-87	5131	. NUT, Knurled (supplied with 86, Figure 6) . . . . . - - - * - - -	1
-88	8683	. RESISTOR, Voltage sensitive (GE)(866B191G3)	1
-89	8627(0.022)	. CAPACITOR, Fixed, ceramic, 0.022 μf ±20 per cent, 500. . . vdcw (AB)(40-223W)(used in units beginning with M-9)	1
-89A	24541(150)	. CAPACITOR, Fixed, ceramic, 150 μμf ±20 per cent, ... 500 vdcw (used in units beginning with M-9)	4
-89B	8627(.01)	. CAPACITOR, Fixed, ceramic, 0.01 μf ±20 per cent, ... 500 vdcw (used in units beginning with M-9)	2
-90	12348	. CONNECTOR, Receptacle, electrical . . . . . (ATTACHING PARTS)	1
-91	5131	. NUT, Knurled (supplied with 90, Figure 6) . . . . . - - - * - - -	1
-92	20811	. CABLE ASSEMBLY	1
-93	20812	. CABLE ASSEMBLY	1
-93A	24543	. CABLE ASSEMBLY (used in units beginning with M-9).	1
-94	19313	. PLATE, Front	1

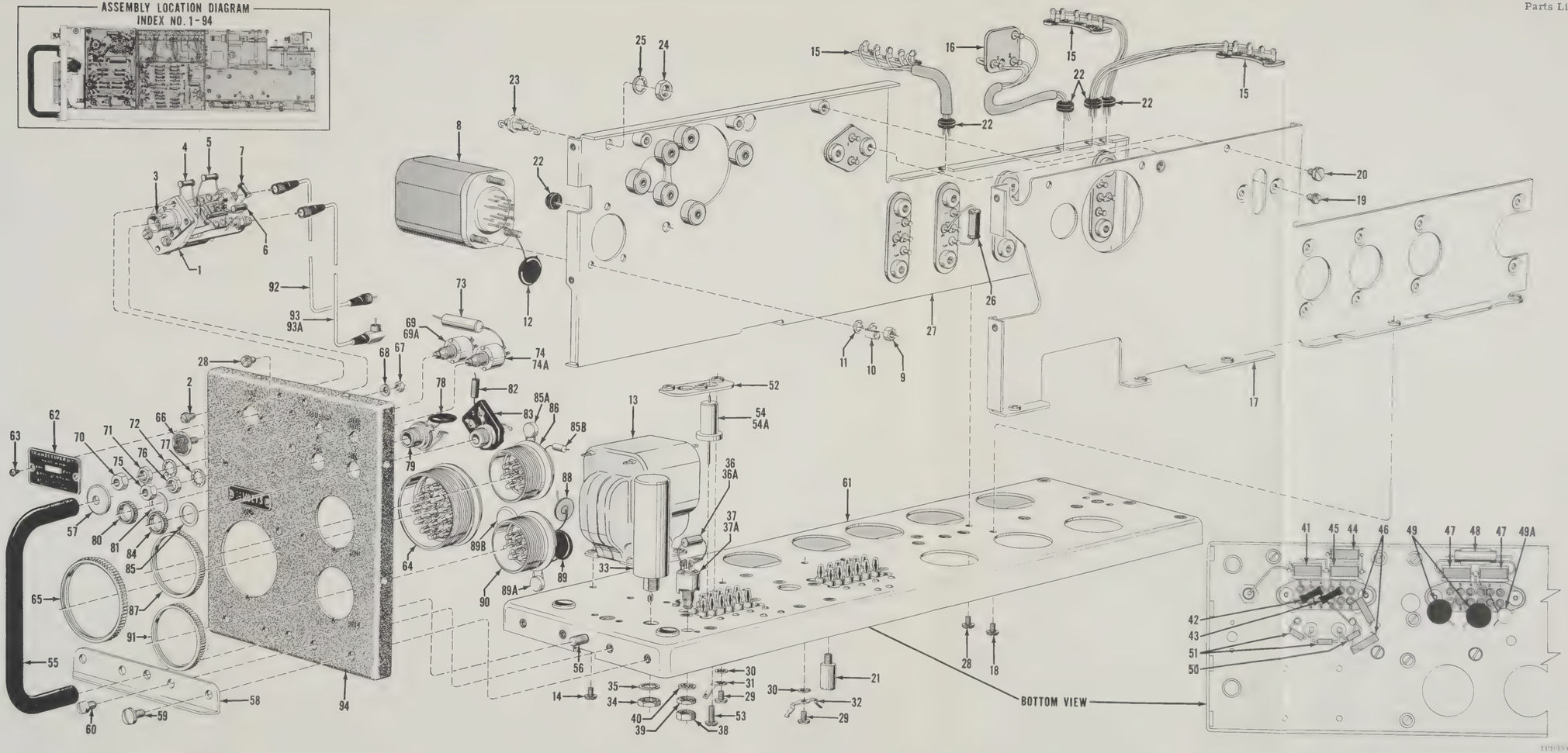


Figure 6. Chassis Assembly

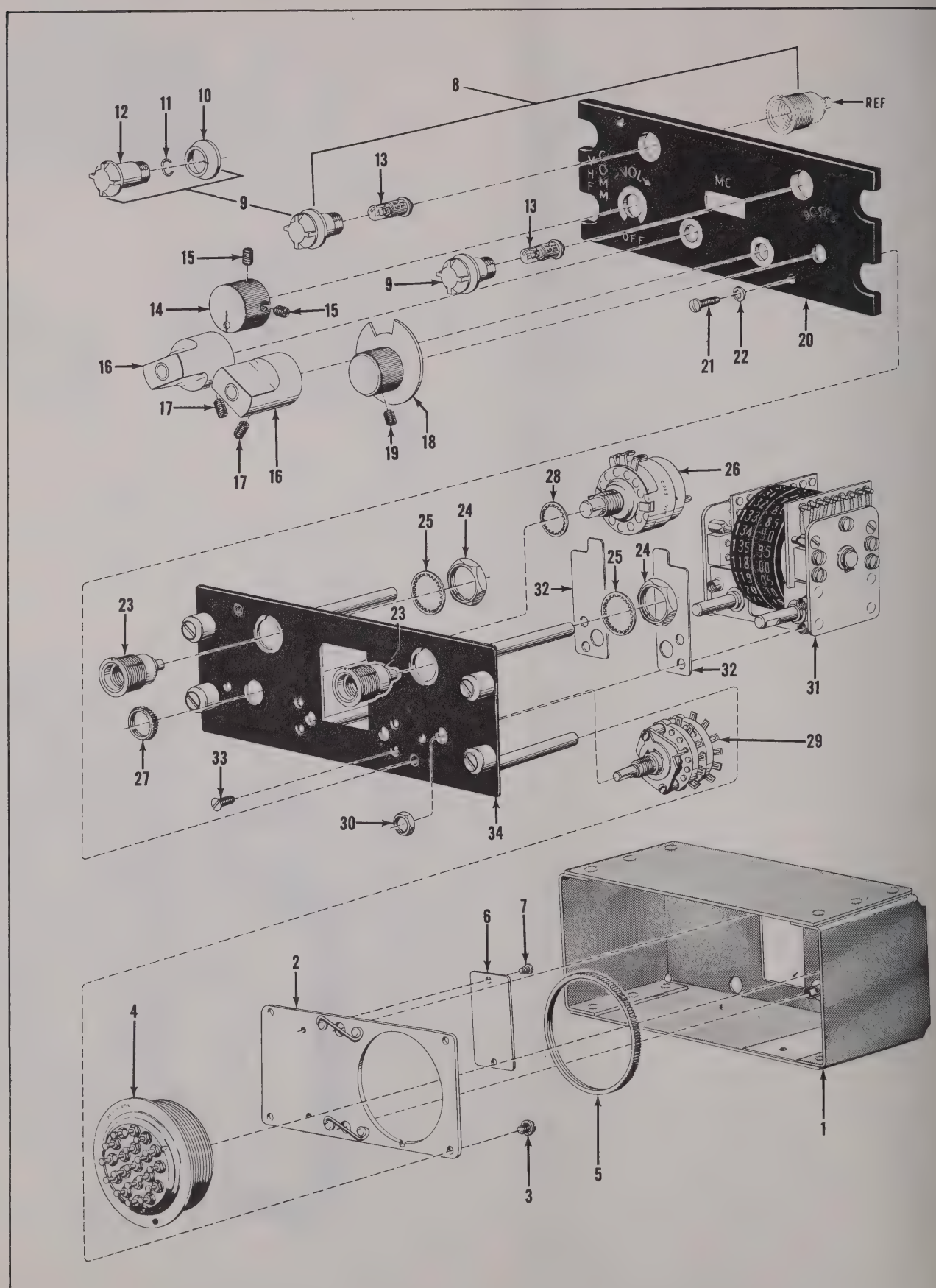


Figure 7. ARC Type C-67A Control Unit Assembly

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
7-	20350	CONTROL UNIT ASSEMBLY, ARC Type C-67A	1
-1	20375	. COVER ASSEMBLY	1
-2	20343	. PLATE ASSEMBLY, Mounting	1
		(ATTACHING PARTS)	
-3	503(3/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lock- . . washer, ni pl, 3-48 thd by 3/16 in. lg (SH)(SEMS)	4
		- - - * - - -	
-4	12357	. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PARTS)	
-5	5310	. NUT, Knurled (supplied with 4, Figure 7)	1
		- - - * - - -	
-6	20349	. PLATE, Identification	1
		(ATTACHING PARTS)	
-7	8081	. SCREW, Tapping, thread forming, rh, Phillips dr, stl, blk . . parkerized, No. 2 by 5/32 in. lg (PK)(Z)	2
		- - - * - - -	
-8	16293	. LIGHT ASSEMBLY, Panel (GMC)(A-5890)	2
-9	—	. . LAMP HOUSING ASSEMBLY (GMC)(A-5181)	2
-10	—	. . . GROMMET, Panel light (GMC)(A-4846A)	2
-11	—	. . . SPRING, Lamp retainer (GMC)(A-3674)	2
-12	—	. . . LAMP HOUSING AND FILTER ASSEMBLY (GMC)(A-5178).	2
-13	8622	. LAMP, Incandescent, 28V, T-1-3/4 bulb (GE)(327)	2
-13	21760	. LAMP KIT, c/o two lamps (GE)(330)(for 14V model)	1
-14	16331	. KNOB	1
		(ATTACHING PARTS)	
-15	305(3/16)	. SETSCREW, Fluted socket dr, cup point, sst, 6-32 thd by 3/16 in. lg	2
		- - - * - - -	
-16	20403	. KNOB	2
		(ATTACHING PARTS)	
-17	306(1/4)	. SETSCREW, Fluted socket dr, cup point, sst, 6-32 thd by 1/4 in. lg.	4
		- - - * - - -	
-18	20399	. KNOB	1
		(ATTACHING PARTS)	
-19	304(3/16)	. SETSCREW, Fluted socket dr, cup point, sst, 4-40 thd by 3/16 in. lg	1
		- - - * - - -	
-20	20374	. PANEL, Printed	1
		(ATTACHING PARTS)	
-21	113(3/8)	. SCREW, Machine, bind hd, brs, blk oxidized, 3-48 thd by 3/8 in. lg	2
-22	10353	. WASHER, Spring tension.	2
		- - - * - - -	
-23	—	. RETAINER, Lamp housing (p/o 8, Figure 7)(GMC)(A-4996) . .	2
		(ATTACHING PARTS)	
-24	—	. NUT, Hexagon, 15/32-32 thd (supplied with 8, Figure 7) . . .	2
-25	—	. WASHER, Lock (supplied with 8, Figure 7)	2
		- - - * - - -	
-26	8862	. RESISTOR, Variable, comp, 0 to 250,000 ohms, with SPST . . switch (AB)(JS-DB2541FS2032)	1
		(ATTACHING PARTS)	
-27	4697	. NUT, Round	1
-28	8540	. WASHER, Lock, ph brz, ni pl, 0.384 ID by 0.500 OD by 0.022 . in. thk (SH)(1920-02)	1
		- - - * - - -	
-29	20332	. SWITCH, Rotary	1
		(ATTACHING PARTS)	
-30	—	. NUT, Hexagon, brs, ni pl, 1/4-32 thd by 0.062 in. thk . . . . (supplied with 29, Figure 7)	1
		- - - * - - -	
-31	20380	. SWITCH ASSEMBLY.	1
-32	16541	. INSULATOR, Plate	1
		(ATTACHING PARTS)	
-33	143(5/16)	. SCREW, Machine, fh, brs, ni pl, 3-48 thd by 5/16 in. lg . . .	4
		- - - * - - -	
-34	20372	. PANEL ASSEMBLY	1

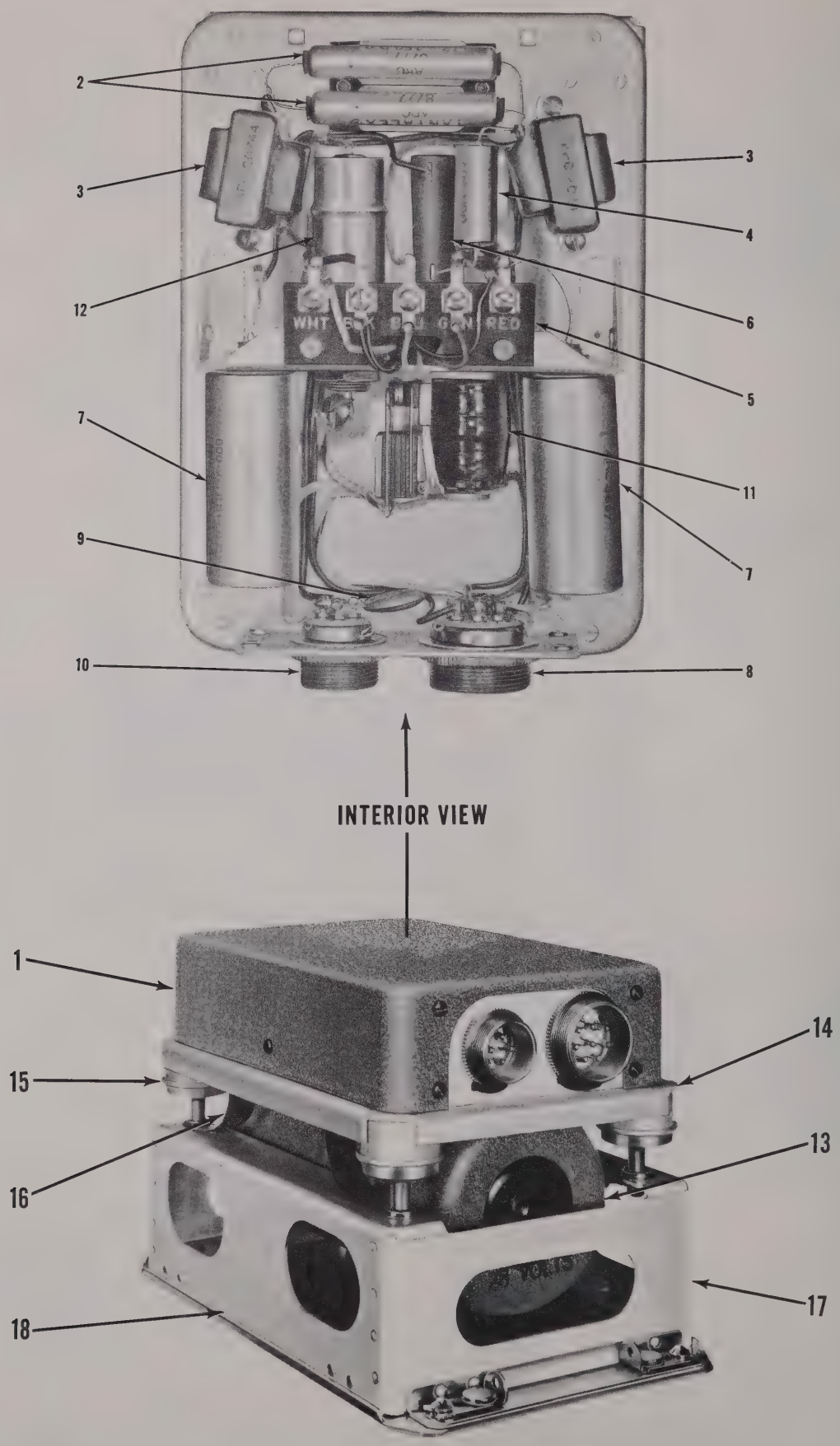


Figure 8. ARC Type P-15A Power Unit Assembly

TP132

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
8-	20650(14V)	POWER UNIT ASSEMBLY, ARC Type P-15A (14V)	1
8-	20650(28V)	POWER UNIT ASSEMBLY, ARC Type P-15A (28V)	1
-1	21308	. COVER	1
		(ATTACHING PARTS)	
	513(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, blk oxidized, 3-48 thd by 1/4 in. lg (SH)(SEMS)	8
		- - - * - - -	
-2	8777	. CAPACITOR, Fixed, electrolytic, 12 μf ±20 per cent, 150 vdcw	2
-3	20744	. REACTOR, 3.3 H, 70 ma	2
		(ATTACHING PARTS)	
	504(1/4)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 1/4 in. lg	2
	104(1/4)	. SCREW, Machine, bind hd, brs, ni pl, 4-40 thd by 1/4 in. lg	2
	7710	. TERMINAL, Lug	2
		- - - * - - -	
-4	8747	. CAPACITOR, Fixed, paper, 0.047 μf ±5 per cent, 200 vdcw (CLD)(TWMA2S47-1)	1
-5	20884	. PLATE, Terminal	1
		(ATTACHING PARTS)	
	5219	. STUD, Threaded	2
		- - - * - - -	
-6	206(7K)	. RESISTOR, Fixed, WW, 7000 ohms ±5 per cent, 10w	1
-7	8897	. CAPACITOR, Fixed, paper, 3 μf ±20 per cent, 400 vdcw (SPR) (116P30504S15)	2
		(ATTACHING PARTS)	
	—	. NUT, Hexagon (supplied with 7, Figure 2)(SPR)(6-113)	2
	—	. WASHER, Lock (supplied with 7, Figure 2)	2
		- - - * - - -	
-8	12348	. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PARTS)	
	5131	. NUT, Knurled (supplied with 8, Figure 2)	1
		- - - * - - -	
-9	8627(.022)	. CAPACITOR, Fixed, ceramic, 22,000 μμf +100 -0 per cent, 500 vdcw (AB)(40-223W)	1
-10	12428	. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PARTS)	
	9327	. NUT, Knurled (supplied with 10, Figure 2)	1
		- - - * - - -	
-11	20917	. RELAY, Armature (PCR)(4CQA19C2)	1
		(ATTACHING PARTS)	
	504(5/32)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 4-40 thd by 5/32 in. lg (SH)(SEMS)	2
		- - - * - - -	
-12	20894	. FILTER, 5 amp, 50V (SPR)(5JX27)	1
		(ATTACHING PARTS)	
	—	. NUT, Hexagon, 1/2-28 thd by 1/8 in. thk (supplied with 12, Figure 2)	1
	—	. WASHER, Lock (supplied with 12, Figure 2)	1
		- - - * - - -	
-13	20676	. DYNAMOTOR ASSEMBLY (14V)(see Figure 9)	1
-13	20677	. DYNAMOTOR ASSEMBLY (28V)(see Figure 9)	1
		(ATTACHING PARTS)	
	509(5/16)	. SCREW, Assembled washer, bind hd, brs screw, sst lockwasher, ni pl, 10-32 thd by 5/16 in. lg (SH)(SEMS)	4
		- - - * - - -	
-14	20888	. BASE SUBASSEMBLY	1
		(ATTACHING PARTS)	
	8051	. SCREW, Machine, fh, stl, cad pl, 3-48 thd by 0.197 in. lg	12
		- - - * - - -	
-15	20915	. ABSORBER, Shock	4
-16	21266	. STRAP	4

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
		(ATTACHING PARTS)	
	607(7/16)	. SCREW, Machine, fil hd, sst, 6-32 thd by 7/16 in. lg	4
	21620	. WASHER, Shouldered.	4
	5108	. WASHER, Flat, ph brz, ni pl, 0.166 ID by 0.437 OD by 0.062 in. thk	4
		- - - * - - -	
8-17	20979	. PLATE, Identification	1
		(ATTACHING PARTS)	
	8081	. SCREW, Tapping, thread forming, rd hd, Phillips dr, stl, blk parkerized, No. 2 by 5/32 in. lg (PK)(Type Z)	2
		- - - * - - -	
-18	20882	. FRAME ASSEMBLY	1

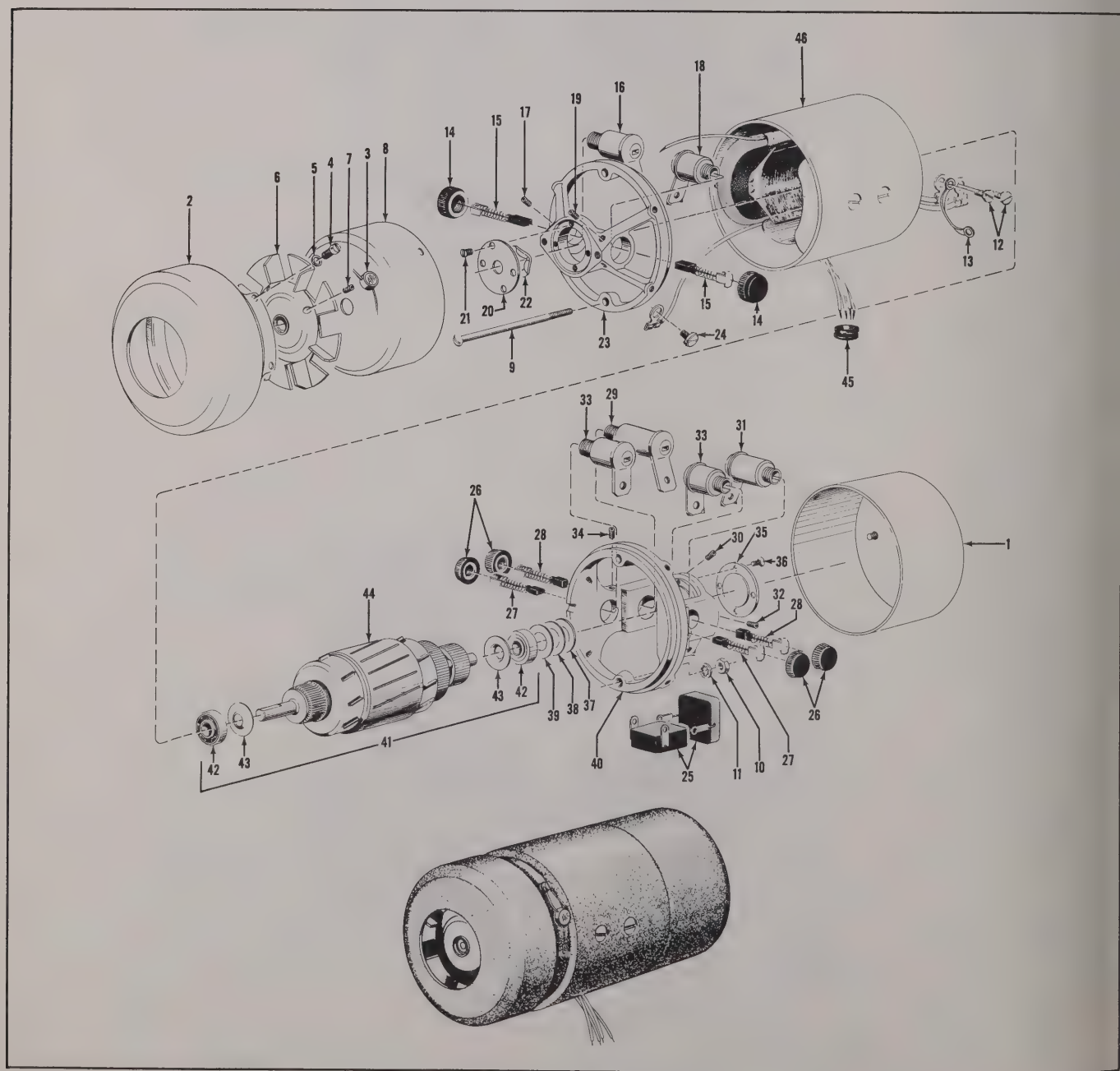


Figure 9. Dynamotor Assembly

TP1617

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
9-	20676	DYNAMOTOR ASSEMBLY (14V)(see 13, Figure 8)	Ref
9-	20677	DYNAMOTOR ASSEMBLY (28V)(see 13, Figure 8)	Ref
-1	8940(0001)	. COVER ASSEMBLY (CE)(52899).	1
-2	8940(0002)	. COVER (CE)(49490)	1
		(ATTACHING PARTS)	
-3	18701	. SEAL	1
-4	166(5/16)	. SCREW, Machine, fil hd, brs, ni pl, 6-32 thd by 5/16 in. lg. .	4
-5	8544	. WASHER, Lock, split, No. 6	4
		- - - * - - -	
-6	8940(0003)	. FAN, Armature assembly (CE)(52897).	1
		(ATTACHING PARTS)	
-7	306(1/8)	. SETSCREW, Splined dr, cup point, sst, 6-32 thd by 1/8 in. lg .	1
		- - - * - - -	
-8	8940(0004)	. COVER, Enclosing (CE)(49439)	1
	8940(0005)	. BEARING BRACKET ASSEMBLY (14V)(CE)(SA-55702).	1
	8940(0006)	. BEARING BRACKET ASSEMBLY (28V)(CE)(SA-54173).	1
		(ATTACHING PARTS)	
-9	8940(0007)	. BOLT, Tie, 6-32 thd by 3-1/2 in. lg (CE)(50193)	2
-10	—	. NUT, Hexagon, brs, ni pl, 6-32 thd.	2
-11	—	. WASHER, Lock (SH)(1906-1)	2
		- - - * - - -	
-12	506(3/16)	. . SCREW, Assembled washer, bind hd, brs screw, sst . . . . lockwasher, ni pl, 6-32 thd by 3/16 in. lg (SH)(SEMS)	2
-13	8940(0008)	. . GROUNDING LINK (CE)(C-32562-2)	1
-14	8940(0009)	. . CAP, Brush (CE)(C-32311-1).	2
-15	8940(0010)	. . BRUSH ASSEMBLY (14V)(CE)(C-33562-26-L12)	2
-15	8940(0011)	. . BRUSH ASSEMBLY (28V)(CE)(C-33562-26-L9)	2
-16	8940(0012)	. . BRUSH HOLDER, Metallic (CE)(C-54110-2)	1
		(ATTACHING PARTS)	
-17	—	. . SETSCREW, Internal hex dr, stl, zinc pl, 6-32 thd by 3/16 in. lg .	2
		- - - * - - -	
-18	8940(0013)	. . BRUSH HOLDER, Nonmetallic (CE)(C-36493-2)	1
		(ATTACHING PARTS)	
-19	—	. . SETSCREW, Internal hex dr, stl, zinc pl, 6-32 thd by 3/16 in. lg .	2
		- - - * - - -	
-20	8940(0014)	. . COVER PLATE, Bearing (CE)(C-38489-2)	1
		(ATTACHING PARTS)	
-21	142(3/16)	. . SCREW, Maching, fh, brs, ni pl, 2-56 thd by 3/16 in. lg . .	4
		- - - * - - -	
-22	8940(0015)	. . WASHER, Spring tension (CE)(52769)	1
-23	8940(0016)	. . BEARING BRACKET (CE)(B-52898-2)	1
	8940(0017)	. BEARING BRACKET ASSEMBLY (CE)(SA-54174)	1
		(ATTACHING PARTS)	
-24	506(3/16)	. SCREW, Assembled washer, bind hd, brs screw, sst . . . . . lockwasher, ni pl, 6-32 thd by 3/16 in. lg (SH)(SEMS)	4
		- - - * - - -	
-25	8618(10000)	. . CAPACITOR, Fixed, mica, 10,000 $\mu\mu$f ±2 per cent,. . . . . 500 vdcw (EMM)(VTCM-35-10000)	2
-26	8940(0018)	. . CAP, Brush (CE)(52837)	4
-27	8940(0019)	. . BRUSH ASSEMBLY (CE)(33562-42-H3).	2
-28	8940(0020)	. . BRUSH ASSEMBLY (CE)(33562-23-H3).	2
-29	8940(0021)	. . BRUSH HOLDER, Nonmetallic (CE)(39936-2).	1
		(ATTACHING PARTS)	
-30	8940(00	. . SETSCREW, Internal hex dr, stl, zinc pl, 6-32 thd by 3/16 in. lg .	2
		- - - * - - -	
-31	8940(0022)	. . BRUSH HOLDER, Metallic (CE)(54108-2)	1
		(ATTACHING PARTS)	
-32	—	. . SETSCREW, Internal hex dr, stl, zinc pl, 6-32 thd by 3/16 in. lg .	2
		- - - * - - -	

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
9-33	8940(0023)	. . BRUSH HOLDER, Nonmetallic (CE)(39936-1) . . . . . (ATTACHING PARTS)	2
-34	—	. . SETSCREW, Internal hex dr, stl, zinc pl, 6-32 thd by 3/16 in. lg	4
		- - - * - - -	
-35	8940(0024)	. . COVER PLATE, Bearing (CE)(C-38489-1). . . . . (ATTACHING PARTS)	1
-36	142(3/16)	. . SCREW, Machine, fh, brs, ni pl, 2-56 thd by 3/16 in. lg	4
		- - - * - - -	
-37	8940(0025)	. . WASHER, Flat, brs, 0.406 ID by 0.620 OD by 0.010 in. thk . . (CE)(33568-1)	AR
-38	8940(0026)	. . WASHER, Flat, stl, 0.406 ID by 0.620 OD by 0.005 in. thk . . . (CE)(33568-2)	AR
-39	8940(0027)	. . WASHER, Flat, ph brz, 0.406 ID by 0.620 OD by 0.003 in. thk . (CE)(33568-3)	AR
-40	8940(0028)	. . BEARING BRACKET (CE)(B-42833-X-1)	1
-41	8940(0029)	. ARMATURE ASSEMBLY (14V)(CE)(55637)	1
-41	8940(0030)	. ARMATURE ASSEMBLY (28V)(CE)(54100)	1
-42	—	. . BEARING, Ball (ND)(7R4-XR1225CF).	2
-43	8940(0031)	. . GREASE SLINGER (CE)(38488).	2
-44	8940(0032)	. . ARMATURE (14V)(CE)(55637-W.S.12717)	1
-44	8940(0033)	. . ARMATURE (28V)(CE)(54100-W.S.12716)	1
-45	8940(0034)	. GROMMET, Rubber (CE)(52814)	1
-46	8940(0035)	. FRAME ASSEMBLY (14V)(CE)(SA-55638)	1
-46	8940(0036)	. FRAME ASSEMBLY (28V)(CE)(SA-54172)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
10-	22560-0014	DYNAVERTER ASSEMBLY, 14V	1
10-	22560-0028	DYNAVERTER ASSEMBLY, 28V	1
-1	23811	. COVER, Pierced . . . . . (ATTACHING PARTS)	1
-2	513-0016	. SCREW, Assembled washer, bind. h, brs screw, sst lock- . . washer, blk oxidized, 3-48 thd by 1/4 in. lg (SH)(SEMS)	8
		- - - * - - -	
-3	24048-0014	. PRINTED CIRCUIT ASSEMBLY, 14V	1
-3	24048-0028	. PRINTED CIRCUIT ASSEMBLY, 28V . . . . . (ATTACHING PARTS)	1
-4	103-0018	. SCREW, Machine, bind. h, brs, ni pl, 3-48 thd by 9/32 in. lg..	4
-5	13473	. WASHER, Spring tension	4
		- - - * - - -	
-6	31186	. . TRANSISTOR (RCA) (2N1701) (used in 14V model)	2
-6	22441	. . TRANSISTOR (RCA) (3622) (used in 28V model).	2
-7	201-0470	. . RESISTOR, Fixed, comp, 47 ohms ±5 per cent, 1/2w (AB) . (EB4705) (used in 14V model)	1
-8	23806	. . BIAS OSCILLATOR ASSEMBLY	1
-9	22635	. . TRANSISTOR, Type 2N270	1
-10	200-0473	. . RESISTOR, Fixed, comp, 47, 000 ohms ±10 per cent, 1/4w . (AB) (CB4731)	1
-11	202-0221	. . RESISTOR, Fixed, comp, 220 ohms ±5 per cent, 1w (AB) . (GB2215) (used in 14V model)	1
-11	202-0431	. . RESISTOR, Fixed, comp, 430 ohms ±5 per cent, 1w (AB) . (GB4315) (used in 28V model)	1
-12	202-0200	. . RESISTOR, Fixed, comp, 20 ohms ±5 per cent, 1w (AB) . . (GB2005) (used in 14V model)	1
-12	201-0330	. . RESISTOR, Fixed, comp, 33 ohms ±5 per cent, 1/2w (AB) . (EB3305) (used in 28V model)	1
-13	202-0471	. . RESISTOR, Fixed, comp, 470 ohms ±5 per cent, 1w (AB) . (GB4715) (used in 14V model)	1
-13	202-0911	. . RESISTOR, Fixed, comp, 910 ohms ±5 per cent, 1w (AB) . (GB9115) (used in 28V model)	1
-14	20474	. . SEMICONDUCTOR DEVICE, Diode, type 1N1560	1
-15	201-0362	. . RESISTOR, Fixed, comp, 3600 ohms ±5 per cent, 1/2w . . . (AB) (EB3625)	1
-16	8996-9473	. . CAPACITOR, Fixed, plastic, 0.047 μf ±20 per cent, 50 vdcw (GAEM) (601PE4730R5W4)	1
-17	8920-0151	. . CAPACITOR, Fixed, electrolytic, 150 μf ±20 per cent, 15 . vdcw (SPR) (150D151X0015B2)	1
-18	201-0102	. . RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, 1/2w . . (AB) (EB1025) (used in 14V model)	1
-18	201-0222	. . RESISTOR, Fixed, comp, 2200 ohms ±5 per cent, 1/2w . . (AB) (EB2225) (used in 28V model)	1
-19	8996-9102	. . CAPACITOR, Fixed, plastic, 0.01 μf ±20 per cent, 50 vdcw . (GAEM) (601PE0140R5W4)	1
-20	8946-0200	. . SEMICONDUCTOR DEVICE, Diode, type 1N1880 (used in . . 14V model)	1
-20	8946-0360	. . SEMICONDUCTOR DEVICE, Diode, type 1N1883 (used in . . 28V model)	1
-21	23037	. . SEMICONDUCTOR DEVICE, Diode (HUG) (HD6226)	3
-22	23943	. . CAPACITOR, Fixed, electrolytic, 60 μf +75 -15 per cent, . . 50 vdcw (FML) (F310)	1
-23	201-0470	. . RESISTOR, Fixed, comp, 47 ohms ±5 per cent, 1/2w (AB) . (EB4705)	1
-24	201-0101	. . RESISTOR, Fixed, comp, 100 ohms ±5 per cent, 1/2w (AB) . (EB1015) (used in 14V model)	1
-24	201-0301	. . RESISTOR, Fixed, comp, 300 ohms ±5 per cent, 1/2w (AB) . (EB3015) (used in 28V model)	1
-25	201-0102	. . RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, 1/2w . . . (AB) (EB1025)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
10-26	201-0510	. . RESISTOR, Fixed, comp, 51 ohms ±5 per cent, 1/2w (AB) (EB5105) (used in 14V model)	1
-26	201-0162	. . RESISTOR, Fixed, comp, 1600 ohms ±5 per cent, 1/2w (AB) (EB1625) (used in 28V model)	1
-27	24047-0014	. . PRINTED CIRCUIT (used in 14V model)	1
-27	24047-0028	. . PRINTED CIRCUIT (used in 28V model)	1
-28	23809	. BASE ASSEMBLY	1
		(ATTACHING PARTS)	
-29	106-0024	. SCREW, Machine, bind. h, brs, ni pl, 6-32 thd by 3/8 in. lg	4
-30	4316	. WASHER, Lock	4
		- - - * - - -	
-31	22325	. . STRAP, Grounding	2
		(ATTACHING PARTS)	
-32	144-0016	. . SCREW, Machine, fh, brs, ni pl, 4-40 thd by 1/4 in. lg	2
-33	8950-0040	. . NUT, Self-locking, hexagon, 4-40 thd (EN) (68NM-40)	2
		- - - * - - -	
-34	——	. . BASE SUBASSEMBLY p/o 23809	1
-35	23641	. POST	2
		(ATTACHING PARTS)	
-36	503-0018	. SCREW, Assembled washer, bind. h, brs screw, sst lockwasher, ni pl, 3-48 thd by 9/32 in. lg (SH) (SEMS)	2
		- - - * - - -	
-37	8897	. CAPACITOR, Fixed, paper, 3 μf ±20 per cent, 400 vdcw (SPR) (116P30504S15)	3
		(ATTACHING PARTS)	
-38	——	. NUT, Hexagon (SPR) (6-113) (supplied with 37, Figure 10)	3
-39	——	. WASHER, Lock (SPR) (2-47) (supplied with 37, Figure 10)	3
		- - - * - - -	
-40	12428	. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PART)	
-41	9327	. NUT, Round (supplied with 40, Figure 11)	1
		- - - * - - -	
-42	20474	. SEMICONDUCTOR DEVICE, Diode, type 1N1560	1
-43	20894	. FILTER, Radio interference (SPR) (5JX27)	1
		(ATTACHING PARTS)	
-44	——	. NUT, Hexagon (supplied with 43, Figure 10)	1
-45	——	. WASHER, Lock (supplied with 43, Figure 10)	1
		- - - * - - -	
-46	12348	. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PART)	
-47	5131	. NUT, Round (supplied with 46, Figure 10)	1
		- - - * - - -	
-48	20917	. RELAY, Armature (PCR) (4CQA19C2)	1
		(ATTACHING PARTS)	
-49	504-0010	. SCREW, Assembled washer, bind. h, brs screw, sst lockwasher, ni pl, 4-40 thd by 5/32 in. lg (SH) (SEMS)	2
		- - - * - - -	
-50	24549	. CAPACITOR, Fixed, paper, 3 μf ±20 per cent, 200 vdcw (SPR) (118P30502S2)	1
-50	8777	. CAPACITOR, Fixed, electrolytic, 12 μf ±20 per cent, 150 vdcw (SPR) (110D47) (used in M-1 and following models)	1
-51	24319	. RELAY (GE) (3S2791G236N14)	1
		(ATTACHING PARTS)	
-52	8040	. NUT, Hexagon, brs, ni pl, 4-40 thd by 0.062 in. thk	2
-52A	18045	. INSULATOR, Standoff (CGT) (X2045FA) (used in M2 and following models)	1
-53	8497	. WASHER, Lock, sst, 0.119 ID by 0.260 OD by 0.016 in. thk (SH) (1704)	2
		- - - * - - -	
-54	23813	. TRANSFORMER (used in 14V model)	1
-54	23789	. TRANSFORMER (used in 28V model)	1

Figure & Index No.	ARC Part No.	1 2 3 4 5 6 Description	Units per Assy
		(ATTACHING PARTS)	
10-55	504-0016	. SCREW, Assembled washer, bind. h, brs screw, sst lock- . . washer, ni pl, 4-40 thd by 1/4 in. lg (SH)(SEMS)	2
-56	8950-0040	. NUT, Self-locking, hexagon, 4-40 thd (EN) (68NM-40). . . .	1
		- - - * - - -	
-57	20744	. REACTOR, 3.3 H, 70 ma (CMPB) (1852)	2
		(ATTACHING PARTS)	
-58	504-0014	. SCREW, Assembled washer, bind. h, brs screw, sst lock- . washer, ni pl, 4-40 thd by 7/32 in. lg (SH)(SEMS)	4
		- - - * - - -	
-58A	8891-9102	. CAPACITOR, Fixed, paper, 0.1 μf ±20 per cent, 300 vdcw . . (SPR) (196P10403S4)	1
-58A	8777	. CAPACITOR, Fixed, electrolytic, 12 μf ±20 per cent, 150 vdcw (SPR) (110D47) (used in M-1 and following models)	1
-59	20474	. SEMICONDUCTOR DEVICE, Diode, type 1N1560	6
-60	23824	. PANEL	1
		(ATTACHING PARTS)	
-61	104-0016	. SCREW, Machine, bind. h, brs, ni pl, 4-40 thd by 1/4 in. lg .	2
-62	7730	. WASHER, Spring tension	2
		- - - * - - -	
-63	21153	. TRANSISTOR (DELCO) (type 2N173) (used in 14V model) . . .	2
-63	26119	. TRANSISTOR (DELCO) (type 2N174) (used in 28V model) . . .	2
		(ATTACHING PARTS)	
-64	4180	. NUT, Hexagon, brs, ni pl, 10-32 thd by 0.094 in. thk	2
-65	4303	. WASHER, Flat, brs, ni pl, 0.200 ID by 0.437 OD by 0.038 in. thk	2
		- - - * - - -	
-66	8946-0200	. SEMICONDUCTOR DEVICE, Diode, type 1N1880	1
-66	8946-0360	. SEMICONDUCTOR DEVICE, Diode, type 1N1883 . . . . . (used in M-1 models)	1
-66A	22298-0360	. SEMICONDUCTOR DEVICE, Diode, type 1N1364A or 1N1826A. (used in M-2 and following models)	1
-66B	8946-0200	. SEMICONDUCTOR DEVICE, Diode, type 1N1880	1
		(ATTACHING PARTS)	
-66C	—	. TERMINAL, Lug (supplied with 66A, Figure 11)	1
-66D	—	. WASHER, Lock (supplied with 66A, Figure 11)	1
		- - - * - - -	
-66E	31142	. POST, Insulating (used in M-2 and following models)	1
		(ATTACHING PARTS)	
-66F	509-0200	. SCREW, Assembled washer, bind. h, brs screw, sst lock- . . washer, ni pl, 10-32 thd by 5/16 in. lg (SH)(SEMS)	1
		- - - * - - -	
-67	206-0251	. RESISTOR, Fixed, ww, 250 ohms ±5 per cent, 10w	1
		(ATTACHING PARTS)	
-68	104-0014	. SCREW, Machine, bind. h, brs, ni pl, 4-40 thd by 7/32 in. lg .	1
-69	5402	. WASHER, Flat, ni sil, 0.116 ID by 0.437 OD by 0.010 in. thk .	1
		- - - * - - -	
-70	23835	. CHASSIS ASSEMBLY	1
-71	18045	. . INSULATOR, Standoff (CGT) (X2045FA)	4
		(ATTACHING PARTS)	
-72	504-0012	. . SCREW, Assembled washer, bind. h, brs screw, sst lock- . washer, ni pl, 4-40 thd by 5/32 in. lg (SH)(SEMS)	4
		- - - * - - -	
-73	12971	. . GROMMET, Rubber (GOS) (427)	1
-74	8927-0004	. . TERMINAL, Lug (SH) (2104-04-00)	2
		(ATTACHING PARTS)	
-75	104-0014	. . SCREW, Machine, bind. h, brs, ni pl, 4-40 thd by 7/32 in. lg	2
-76	8040	. . NUT, Hexagon, brs, ni pl, 4-40 thd by 0.062 in. thk	2
-77	8497	. . WASHER, Lock, sst, 0.119 ID by 0.260 OD by 0.016 in. . . . thk (SH) (1704)	2
		- - - * - - -	
-78	—	. . CHASSIS	1

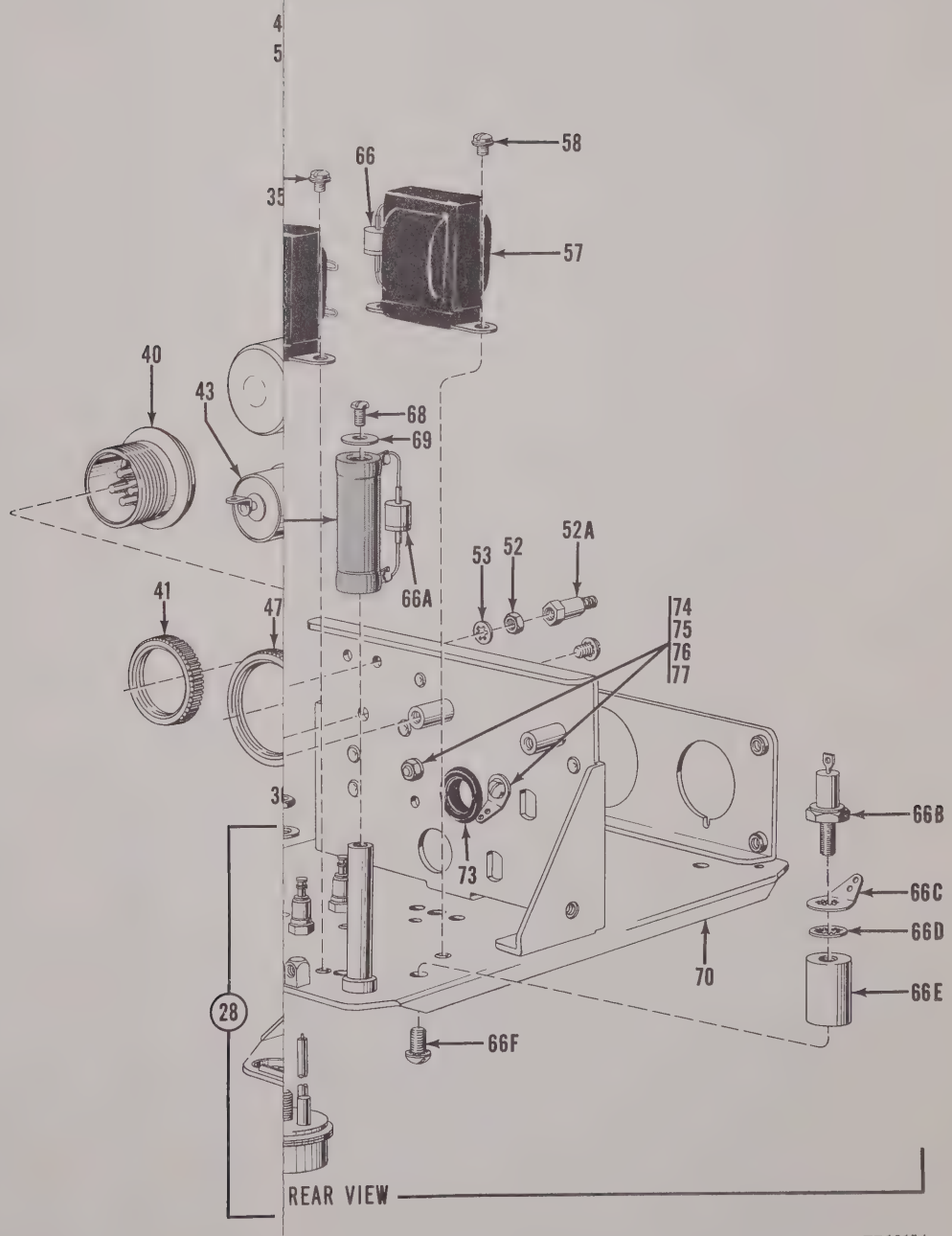
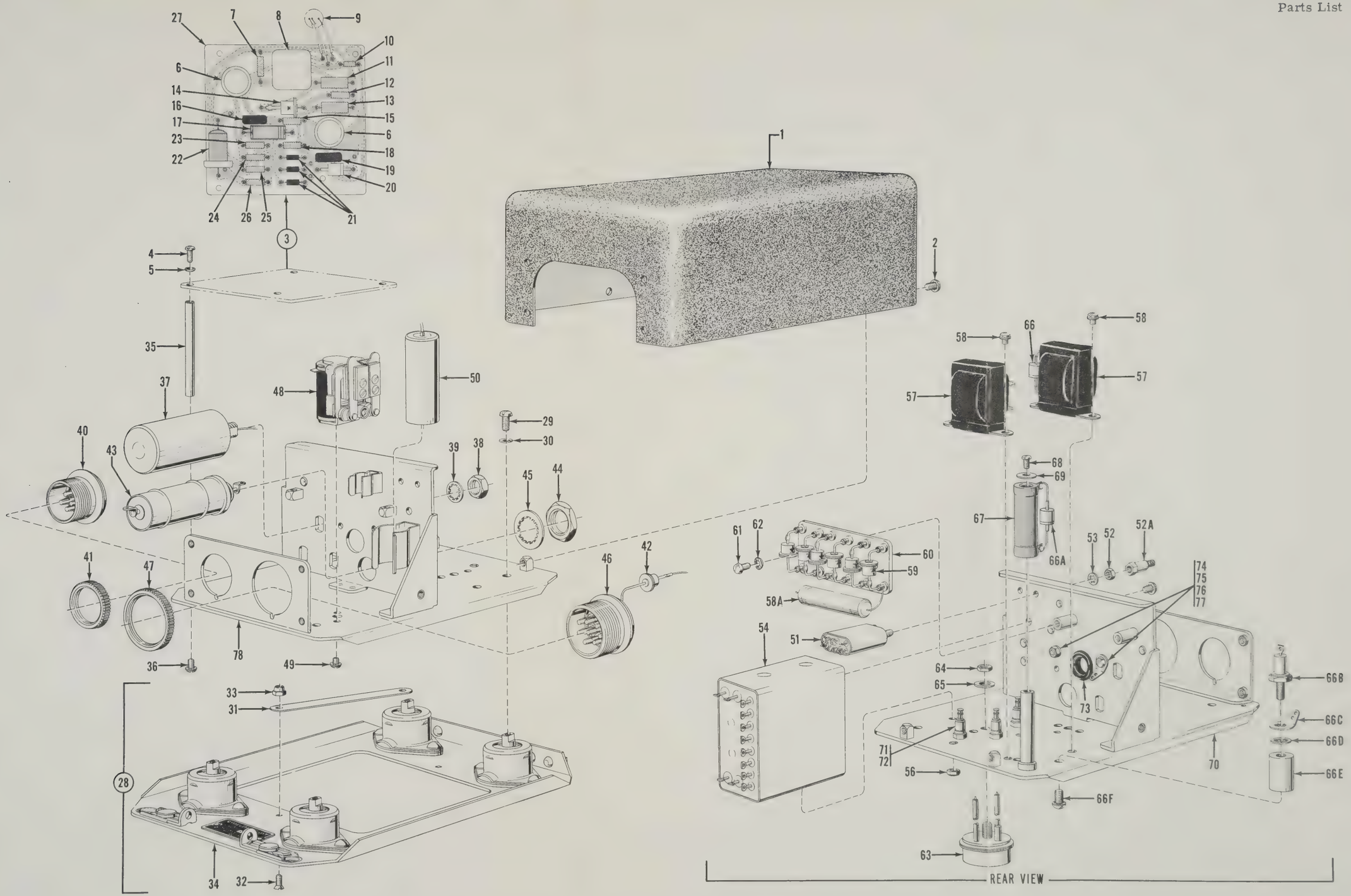


Figure 10. DV-15A Dynaverter, Exploded View



TP1915A

Figure 10. DV-15A Dynaverter, Exploded View

SECTION III

NUMERICAL INDEX

Part No.	Figure & Index No.	Total Quantity
Base	10-34	1
Bearing	9-42	2
Chassis	10-78	1
Gear Assembly	2-11	1
Lever	3-53A	2
Lever	4-22	1
Nut	3-103A	1
Nut	4-135	2
Nut	4-158	4
Nut	4-174	1
Nut	6-24	1
Nut	7-24	2
Nut	7-30	1
Nut	10-38	4
Plate	3-100	1
Plate	4-182	1
Setscrew	9-17	2
Setscrew	9-19	2
Setscrew	9-30	2
Setscrew	9-32	2
Setscrew	9-34	4
Terminal	10-66B	1
Washer	7-25	2
Washer	8-7	2
Washer	8-12	1
Washer	9-11	2
Washer	10-39	5
	10-45	
	10-66C	
A-3674	7-11	2
A-4846A	7-10	2
A-4996	7-23	2
A-5178	7-12	2
A-5181	2-9	2
A-5890	7-8	Ref
BU20251MV5V	4-109	Ref
BU20-102N-Y5Y	4-241	Ref
B-42833-X-1	9-40	Ref
B-52898-2	9-23	Ref
CB1001	3-129A	Ref
CB1031	6-5	Ref
CB1041	3-133	Ref
	6-6	
CB1051	4-226	Ref
	4-222A	
CB1551	4-222	Ref
CB2211	3-113	Ref
	4-120	
CB2231	3-130	Ref
CB2411	3-129	Ref
CB3331	3-112	Ref
	3-150	
	4-122	

Part No.	Figure & Index No.	Total Quantity
CB3341	5-8A	Ref
CB3931	3-134	Ref
CB4701	4-46	Ref
	4-151	
CB4711	6-4	Ref
CB4721	3-137	Ref
CB4731	10-10	Ref
CB5611	3-136	Ref
CB6811	4-71	Ref
CB8231	4-76	Ref
	4-79	
CC20HG100C	4-168	Ref
CC20HG240G	3-120	Ref
	3-135	
CC20HH070C	4-129	Ref
CF-Ir-7/16	3-126	Ref
	3-199	
CF-100-2-1022	3-107	Ref
	3-144	
	4-117	
	4-141	
	4-161	
CR2791G121A43	6-8	1
CW39D061KSP	6-54	Ref
C-32311-1	9-14	Ref
C-32562-2	9-13	Ref
C-33562-26-L12	9-15	Ref
C-33562-26-L9	9-15	Ref
C-36493-2	9-18	Ref
C-38489-1	9-35	Ref
C-38489-2	9-20	Ref
C-54110-2	9-16	Ref
DS36-472W	4-250	Ref
EB1015	4-166	Ref
	10-24	
EB1025	3-16	Ref
	3-99	
	3-162	
	5-17	
	10-18	
	10-25	
EB1035	3-98	Ref
	3-172	
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EB1045	4-80	Ref
	4-93	
	4-142	
	4-165	
	4-208	
	4-239	
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Part No.	Figure & Index No.	Total Quantity
EB1055	4-230	Ref
	4-244	
	5-15	
EB1115	6-51	Ref
EB1505	3-35B	Ref
EB1515	3-162A	
EB1525	4-116	Ref
EB1535	4-209	Ref
	3-108A	
EB1545	4-140	Ref
	4-237	
EB1555	4-232	Ref
EB1625	5-25	Ref
	10-26	
EB2035	3-109	Ref
EB2055	4-229	Ref
EB2215	3-28	Ref
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EB2225	5-16	Ref
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EB2235	3-14	Ref
	4-74	
	4-238	
EB2245	4-237A	Ref
	5-28	
	6-24	
EB2255	4-248	Ref
EB2735	4-91	Ref
	4-240	
	5-11	
EB3015	10-24	Ref
EB3305	10-12	Ref
EB3325	4-125	Ref
EB3335	3-108	Ref
	4-210B	
EB3345	4-237	Ref
EB3625	10-15	Ref
EB4705	3-198	Ref
	10-7	
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EB4715	4-207	Ref
	4-234	
EB4725	3-160	Ref
EB4735	4-227	Ref
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EB4745	4-163	Ref
	4-225	
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EB5105	10-26	Ref
EB6225	6-36A	Ref
EB6815	4-139	Ref
	4-210	
EB6825	6-36	Ref
EB6845	4-228	Ref
EB8235	4-240	Ref
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F310	6-54A	Ref
	10-22	
GB1235	3-12	Ref

Part No.	Figure & Index No.	Total Quantity
GB2005	10-12	Ref
GB2215	10-11	Ref
GB2235	3-12A	Ref
GB2715	4-224	Ref
GB4315	10-11	Ref
GB4715	10-13	Ref
GB9115	10-13	Ref
GLB5032SD3028L	6-37	Ref
	6-37A	
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	6-69A	
GLU1042SD3028L	5-19A	Ref
GLU5042SD3028L	5-19	
	6-74	
	6-74A	
HB1025	6-45	Ref
HB1515	3-10	Ref
HB1535	6-41	Ref
HB4725	6-47	Ref
HB4735	6-82	Ref
HB6825	6-44	Ref
HD6226	4-223A	Ref
	4-236A	
	6-85B	
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JS-DB2541FS2032	7-26	Ref
M4721	5-21	5
	6-39	
	6-71	
	6-76	
M4748	5-22	5
	6-40	
	6-72	
	6-77	
M4761	5-20	5
	6-38	
	6-70	
	6-75	
RSE-5-9.7	6-48	Ref
RS-2-126	6-26	Ref
	6-42	
RS-2-3	6-43	Ref
SA-54172	9-46	Ref
SA-54173	9-8	Ref
SA-54174	9-23	Ref
SA-55638	9-46	Ref
SA-55702	9-8	Ref
SSRS77NR3-HGZD1228E	3-85	Ref
	3-234	
	4-52	
	4-105	
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SSRS77NR4-HGZD1228E	3-61	Ref
	4-36	
TWA3S1GS-10	4-73	Ref
	4-199	
	4-243	
TWA3S1-10	4-81	Ref
	4-92	
	4-94	
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	4-255	

Part No.	Figure & Index No.	Total Quantity
TWA3S1-10 (cont)	5-4	Ref
	5-8	
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TWA3S47-10	5-3	Ref
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TWMA2S47-1	8-4	Ref
TWM104	4-245	Ref
	4-247	
VC20G	4-119A	Ref
VTCM-20-1000	5-6	Ref
	9-25	
VTDM-15-100	4-128	Ref
	4-252	
VTDM-15-240	3-128	Ref
VTDM-15-51	3-110	Ref
	3-125	
	3-170	
	4-121	
	4-138	
	4-241	
	5-27	
VTDM-15-91	4-75	Ref
	4-78	
VTDM-19-2200	4-246	Ref
X2045FA	10-7	Ref
Z	7-7	Ref
	8-17	
0B2	5-2	Ref
1N1364A	10-52A	Ref
	10-66A	
1N1560	10-14	Ref
	10-42	
	10-59	
1N1826A	10-66A	Ref
1N1880	10-20	Ref
	10-66	
	10-66D	
1N1883	10-20	Ref
	10-66	
1N459	4-231	Ref
	4-236	
1N462	3-35A	Ref
	4-8A	
	4-223	
1N90	6-7	Ref
10100-620	4-96	Ref
	4-124	
10100-622	4-164	Ref
10100-628	3-89	Ref
	3-138	
	4-108	
10100-630	3-11	Ref
	3-131	
	3-185	
10102-636	4-145	Ref
10100-652	3-15	Ref
	3-132	
	3-161A	
10274	3-82	3
	4-45C	
10283	3-27	2
10284	3-19	1

Part No.	Figure & Index No.	Total Quantity
10290	3-156	2
	3-192	
103(1/2)	3-91	6
	3-95	
	4-111	
103(1/4)	3-20	22
	3-48	
	3-105	
	3-142	
	3-165	
	3-179	
	4-1	
	4-16	
	4-205	
	4-218	
	4-220	
103(3/16)	3-103	4
	4-119	
103(5/32)	4-148	1
103(9/32)	10-4	4
10353	4-2	12
	4-206	
	4-219	
	4-221	
	7-22	
104(1-1/8)	2-4	2
104(1/4)	3-207	8
	4-3	
	6-29	
	8-3	
	10-61	
104(3/16)	3-123	6
	3-153	
	3-176	
	3-189	
	4-133	
104(7/32)	4-177	4
	10-68	
	10-75	
106(3/4)	10-29	4
106(7/32)	2-13	2
	2-16	
106(9/32)	2-14	9
	2-17	
	2-19	
110D47	4-254	Ref
	10-50	
	10-58A	
113(3/8)	7-21	2
116P30504S15	8-7	Ref
	10-37	
118P30502S2	10-50	Ref
12348	6-90	3
	8-8	
	10-46	
12355	6-86	1
12357	6-64	2
	7-4	
12428	8-10	2
	10-40	
12517	6-81	2
	6-85	

Part No.	Figure & Index No.	Total Quantity
12970	6-22	5
12971	10-73	1
13039	6-32	1
13473	3-93	18
	3-97	
	3-106	
	3-113	
	3-143	
	3-166	
	3-180	
	10-5	
13886	6-55	1
13996	2-2	2
14100	6-66	1
14141	3-15	5
	3-132	
	3-161A	
14143	4-134	6
	4-157	
142(3/16)	9-21	8
	9/36	
143(5/16)	7-33	4
144(1/4)	10-32	2
14785	3-225	5
	4-184	
150D154X0035A2	4-247	Ref
150D268B1	4-204	Ref
	4-235	
150D476X0035S2	10-17	Ref
15174	3-126	2
	3-199	
15181	3-55	3
	4-28	
15230	3-24	1
15453	3-215	4
	4-180	
16088	3-56	5
	4-29	
	4-34	
16171	3-168	3
	3-195	
	4-67	
16293	7-8	2
16331	7-14	1
16541	7-32	1
166(5/16)	9-4	4
168(5/16)	6-60	2
1703	3-22	Ref
	3-26	
	4-201	
1704	3-210	Ref
	10-53	
	10-77	
1712	6-25	Ref
1714-05	4-175	Ref
17166	3-21	1
17326	3-44	5
	3-223	
	4-13	
	4-196	
17633	3-35A	7
	4-8A	
	4-223	

Part No.	Figure & Index No.	Total Quantity
17635	6-8	1
17742	3-39	7
	3-51	
	4-19	
	4-24	
	4-103	
17765	3-40	AR
	4-25	
17768	3-45	AR
	4-14	
17953	4-231	2
	4-236	
18045	10-52A	5
	10-71	
1852	8-3	Ref
	10-57	
186P47404T15	6-33	Ref
18701	9-3	1
18800	2-10	1
18801	2-10	1
1906-1	9-11	Ref
1920-02	4-89	Ref
	7-28	
19300(14V)	2-	1
19300(28V)	2-	1
19302(14V)	2-20	1
	6-	
19302(28V)	2-20	1
	6-	
19304	6-61	1
19313	6-94	1
19315	6-1	1
19318	6-3	1
19323	3-3	1
19326	6-27	1
19334	6-17	1
19336	3-69	3
	4-40	
19339	6-15	3
19342	6-16	1
19345	6-13	1
19367	3-222	1
19370(14V)	2-12	1
	3-	
19370(28V)	2-12	1
	3-	
19372	(3-)	2
19374	3-68	6
	4-39	
19380	3-94	1
19386	3-237	1
19390	3-205	1
19419	3-217	8
	4-178	
1942B	6-13	Ref
19420	3-203	1
19422	3-104	4
	3-141	
	3-164	
	3-178	
19424	3-219	1
19442	3-54	6
	4-27	

Part No.	Figure & Index No.	Total Quantity
19443	3-64	3
	4-35	
19446	3-59	1
19447	3-58	2
	4-31	
19448	3-190	1
19451	3-154	1
19460	4-45A	1
19465	3-214	1
19467	3-228	8
	4-186	
19473	3-77	1
19478	3-65	3
	4-33	
19480	2-1	1
19542	2-8	1
19543	2-6	1
19544(14V)	2-3	1
19544(28V)	2-3	1
19551	3-52	3
	4-20	
19566	3-41	3
	4-26	
19568	3-38	3
	3-46	
	4-15	
19569	3-42	1
19570	3-53	3
	4-21	
19571	3-37	3
	3-47	
	4-23	
19572	3-57	3
	4-30	
19573	3-60	3
	4-32	
19574	3-50	3
	4-18	
19576	3-212	1
19580	3-196	1
19584	3-167	2
	3-194	
19585	(3-)	1
19586	3-181	1
19588	(3-)	1
19589	3-169	1
19592	(3-)	1
19593	3-145	1
19597	(3-)	1
19598	3-115	1
196P10403S4	10-58A	Ref
196P22302S4	4-255	Ref
19603	3-102	2
	4-118	
19611	(3-)	1
19616	3-202	1
19617	3-186	1
19619	3-147	1
19620	3-173	2
19623	3-71	1
19624	3-72	1
19625	4-44	1

Part No.	Figure & Index No.	Total Quantity
19626	3-224	2
	4-183	
19628	3-5	1
19639	3-187	1
19645	3-229	7
	4-187	
19646	3-231	1
19647	3-30	1
19649	3-233	1
19650	3-73	3
	4-42	
19653	3-7	1
19655	3-17	1
19657(*)	3-75	20
19658(*)	3-76	36
	4-45	
19659	3-193	1
19660(14V)	(3-)	1
19660(28V)	(3-)	1
19661	3-70	1
19662	6-8	1
19664	3-34	3
	4-8	
19665	3-34	3
	4-8	
19668	(3-)	1
19669	3-66	1
19674	(3-)	2
	(4-)	
19676	4-176	1
19681	4-66	1
19685	(4-)	1
19686	4-65	1
19687	4-69	1
19688	4-63	1
19692	4-97	1
19698	4-85	2
19715	4-87	2
19716	(4-)	1
19724	4-90	1
19725	5-34	1
19732	4-83	1
19869	4-86	1
19871	4-84	1
19873	4-144	1
19874	(4-)	1
19879	4-58	1
19883	4-127	1
19884	(4-)	2
19887	(4-)	1
19888	4-167	1
19892	4-56	2
19896	6-1	1
19897	4-146	1
19920	4-130	1
19921	4-153	1
19922	4-154	1
19923	3-116	2
	4-131	
19924	4-170	1
19929	4-132	3
	4-155	

Part No.	Figure & Index No.	Total Quantity
19929(cont)	4-171	
19933	4-202	1
19934	4-195	1
19940	(4-)	1
19942	(4-)	1
19943	4-55	1
19944	(4-)	1
19945	4-114	1
19946	4-50	2
19950	4-102	1
19954	4-264	1
19955	4-257	1
19959	(4-)	1
19961	4-262	1
19963	6-7	1
19968	4-98	3
	4-215	
19975	4-197	1
19978	4-211	1
19979	(4-)	1
19990(14V)	(4-)	1
19990(28V)	(4-)	1
2-47	6-35	Ref
	10-39	
2N1701	10-6	Ref
2N173	10-63	Ref
2N174	10-63	Ref
2N270	10-9	Ref
200(1MEG)	4-226	2
	4-222A	
200(1.5MEG)	4-222	1
200(1K)	3-129A	3
200(10K)	6-5	1
200(100K)	3-133	2
	6-6	
200(22K)	3-130	2
200(220)	3-113	4
	4-120	
200(240)	3-129	3
200(33K)	3-112	3
	3-150	
	4-122	
200(330K)	5-8A	1
200(39K)	3-134	2
200(47)	4-46	2
	4-151	
200(47K)	10-10	1
200(4700)	3-137	2
	6-4	
200(560)	3-136	1
200(680)	4-71	1
200(82K)	4-76	2
	4-79	
201(1MEG)	4-230	7
	4-244	
	5-15	
201(1.5MEG)	4-232	2
201(1K)	3-16	6
	3-99	
	3-162	
	5-17	
	10-18	
	10-25	

Part No.	Figure & Index No.	Total Quantity
201(10K)	3-98	3
	3-172	
	4-233	
201(100)	4-166	2
	10-24	
201(100K)	4-80	14
	4-93	
	4-142	
	4-165	
	4-208	
	4-239	
	5-12	
	5-24	
	5-29	
	5-31	
201(110)	6-51	2
201(15)	3-35B	1
201(150)	3-162A	1
201(15K)	4-209	4
	3-108A	
201(150K)	4-140	2
	4-237	
201(1500)	4-116	1
201(1600)	5-25	2
	10-26	
201(2MEG)	4-229	1
201(2.2MEG)	4-248	1
201(2K)	10-18	1
201(20K)	3-109	1
201(22K)	3-14	4
	4-74	
	4-238	
201(220)	3-28	2
	6-50	
201(220K)	5-28	3
	6-82	
	4-237A	
201(2200)	5-16	2
	5-26	
201(27K)	4-91	3
	4-240	
	5-11	
201(300)	10-24	1
201(33K)	3-108	2
	4-210B	
201(330K)	4-237	1
201(33)	10-12	1
201(3300)	4-125	1
201(3600)	10-15	1
201(47)	3-198	3
	10-7	
	10-23	
201(47K)	4-227	5
	5-14	
	5-18	
	5-30	
201(470)	4-207	3
	4-234	
201(470K)	4-163	7
	4-225	
	4-249	
201(4700)	3-160	1
201(51)	10-26	1

Part No.	Figure & Index No.	Total Quantity
201(6200)	6-36A	1
201(680)	4-139	2
	4-210	
201(680K)	4-228	1
201(6800)	6-36	1
201(82K)	4-240	2
	4-242	
202(12K)	3-12	1
202(20)	10-12	1
202(22K)	3-12A	1
202(220)	10-11	1
202(270)	4-224	1
202(430)	10-11	1
202(470)	10-13	1
202(910)	10-13	1
203(1K)	6-45	1
203(15K)	6-41	1
203(150)	3-10	1
203(47K)	6-82	1
203(4700)	6-47	2
203(6800)	6-44	1
20301	4-173	1
20304	4-41	1
20332	7-29	1
20343	7-2	1
20349	7-6	1
20350	7-	1
20360	2-18	1
	5-	
20362	5-32	1
20369	(4-)	1
20372	7-34	1
20374	7-20	1
20375	7-1	1
20380	7-31	1
20395	(4-)	1
20396	4-253	1
20399	7-18	1
204(10)	3-110	2
	4-123	
20403	7-16	4
20407	6-58	1
20420(14V)	2-15	1
	4-	
20420(28V)	2-15	1
	4-	
20454	10-63	2
20474	10-14	8
	10-42	
	10-59	
206(250)	10-67	1
206(7K)	8-6	1
20612	3-157	1
20620	3-85	6
	3-234	
	4-52	
	4-105	
	4-192	
20621	3-87	3
	4-54	
	4-107	
20622	3-62	3
	4-38	

Part No.	Figure & Index No.	Total Quantity
20623	3-63	3
	4-37	
20624	3-61	3
	4-36	
20625	3-78	7
	3-86	
	3-235	
	4-53	
	4-106	
	4-193	
20650(14V)	8-	1
20650(28V)	8-	1
20666	6-23	1
20676	8-13	1
	9-	
20677	8-13	1
	9-	
20679	4-259	1
20733	3-32	3
	4-6	
20744	8-3	4
	10-57	
20806	3-1	1
20811	6-92	1
20812	6-93	1
20814	6-62	1
20815	6-62	1
20882	8-18	1
20884	8-5	1
20888	8-14	1
20894	8-12	2
	10-43	
209(126)	6-26	2
	6-42	
209(3)	6-43	1
20915	8-15	4
20917	8-11	2
	10-48	
20947	4-189	1
20979	8-17	1
210(9700)	6-48	1
2104-04-00	10-74	Ref
21153	10-63	2
21248	4-212	1
21266	8-16	4
21303	3-90	2
	4-110	
21308	8-1	1
21319	4-136	5
	4-159	
21322	3-79	3
	3-236	
	4-194	
21326	3-121	3
	3-151	
	3-174	
21327	6-52	1
21328	6-21	2
21373	3-80	1
21477	4-11	1
21478	4-62	AR
21482	3-221	2
	3-191	

Part No.	Figure & Index No.	Total Quantity
21485(0.15)	4-247	1
21485(1)	4-204	3
	4-235	
21504	3-43	3
	4-12	
2153-6	6-10	Ref
21620	8-16	4
21758	6-57	1
21760	7-13	AR
21965	4-245	2
	4-247	
22298-0360	10-66A	1
22325	10-31	2
22441	10-6	2
22560-0014	10-	1
22560-0028	10-	1
22635	10-9	1
23037	4-223A	8
	4-236A	
	6-85B	
	10-21	
23641	10-35	2
23789	10-54	1
23806	10-8	1
23809	10-28	1
23811	10-1	1
23813	10-54	1
23824	10-60	1
23943	6-54A	3
	10-22	
24047-0014	10-27	1
24047-0028	10-27	1
24048-0014	10-3	1
24048-0028	10-3	1
24319	10-51	1
24541	6-49A	9
	6-85A	
	6-89A	
24543	6-93A	1
2522-6-1	4-185	Ref
26119	10-63	2
26298	3-74A	1
26825-0222	4-81A	1
28290	3-107A	6
	3-144A	
29737-0002	3-102A	2
	4-119A	
3S2791G121A41	6-8	Ref
3S2791G236N14	10-51	Ref
304(1/8)	3-155	19
	3-191	
	3-218	
	3-230	
	3-232	
	4-60	
	4-179	
	4-188	
304(3/16)	7-19	1
306(1/4)	7-17	6
306(1/8)	3-220	5
	4-190	
	9-7	

Part No.	Figure & Index No.	Total Quantity
306(3/16)	4-68	4
	7-15	
31090-9201	3-120A	1
31142	10-66E	1
31186	10-6	2
314(1/4)	3-36	12
	4-10	
3223	3-3	Ref
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330	7-13	Ref
33562-23-H3	9-28	Ref
33562-42-H3	9-27	Ref
33568-1	9-37	Ref
33568-2	9-38	Ref
33568-3	9-39	Ref
336(1/8)	3-81	3
	4-45B	
357	4-134	Ref
	4-157	
	6-23	
36-103W	3-127	Ref
3622	10-6	Ref
3684	4-104	1
38488	9-43	Ref
39936-1	9-33	Ref
39936-2	9-29	Ref
4CQA19C2	8-11	Ref
	10-48	
40-223W	4-95	Ref
	6-12	
	6-49	
	6-78	
	6-89	
	8-9	
4023	3-226	6
	4-185	
4041	6-9	3
4058	4-57	22
4103	3-22	14
	3-26	
	4-201	
4180	10-64	2
427	10-73	Ref
4303	10-65	2
4316	10-30	4
4548	3-227	2
4561	3-92	16
	3-96	
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49490	9-2	Ref
5JX27	8-12	Ref
	10-43	
50193	9-9	Ref
502(3/16)	2-7	4
502(5/32)	4-51	4
502(7/32)	4-99	8

Part No.	Figure & Index No.	Total Quantity
502(7/32)(cont)	4-213	
	4-216	
503(1/4)	3-8	73
	3-9	
	3-18	
	3-25	
	3-83	
	3-124	
	3-158	
	3-177	
	3-197	
	4-47	
	4-59	
	4-70	
	4-101	
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	4-160	
	4-203	
	4-218	
	4-258	
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	6-2	
	6-19	
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	4-43	
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	7-3	
503(5/16)	3-35	13
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503(5/32)	2-9	7
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504(1-5/16)	3-29	6
	4-5	
504(1/4)	3-206	22
	6-14	
	6-18	
	6-28	
	8-3	
	10-55	
503(9/32)	10-36	2
504(3/16)	3-216	8
	4-181	
	10-72	
504(3/8)	3-208	1
504(5/32)	8-11	4
	10-49	
504(7/16)	6-53	3
504(7/32)	3-122	14
	3-152	
	3-175	
	3-188	
	3-204	
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504(9/32)	3-2	18
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Part No.	Figure & Index No.	Total Quantity
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	4-115	
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506(1/4)	6-20	1
506(3/16)	9-12	6
	9-24	
508(3/8)	6-59	2
509(1/2)	6-56	2
509(5/16)	8-13	5
	10-66F	
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5101-56-W	3-78	Ref
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5101-62-W	3-63	Ref
5108	8-16	4
513(1/4)	8-1	16
	10-2	
5131	6-87	4
	6-91	
	8-8	
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5133-12-C-MC	4-13	Ref
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5216	3-211	1
5219	8-5	2
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52899	9-1	Ref
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5896	4-260	Ref
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601PE0140R5W4	10-19	Ref
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6021	3-114	Ref
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614	6-22	Ref
653C4	5-20	Ref
68NM-40	10-33	Ref
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6850	3-4	Ref
	5-1	
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700(103)	5-2	1
700(121)	3-23	1
700(122)	3-139	3
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700(129)	3-163	2
	4-214A	
700(131)	4-260	1
700(132)	4-82	5
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700(133)	4-256	1
700(136)	3-114	5
	3-140	
	4-126	
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700(143)	3-4	2
	5-1	
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7565	6-79	1
7710	6-31	3
	8-3	
7730	2-5	7
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	4-4	
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7742	6-10	3
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8081	6-63	6
	7-7	
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8278	4-49	2
8363	4-149	2
	4-169	
8464	4-241	1
8486	6-25	1
8488	6-11	3

Part No.	Figure & Index No.	Total Quantity
8489	3-103B	1
8497	3-210	7
	6-30	
	10-53	
	10-77	
8535	4-109	2
	4-246	
8540	4-89	3
	7-28	
8541	4-152	1
8544	9-5	4
8554	4-72	1
8617(1000)	5-6	2
8618(10000)	9-25	2
8622	7-13	2
8625(.001)	3-35C	2
	4-8B	
8626(4700)	4-250	1
8627(0.01)	3-127	3
	89B	
	3-127A	
8627(0.022)	4-95	9
	6-12	
	6-49	
	6-78	
	6-89	
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8661	4-175	1
8665(10)	4-168	1
8682	6-37	2
	6-69	
8683	6-88	1
8747	8-4	1
8756	6-33	1
8765(24)	3-120	4
	3-135	
8765(7.0)	4-129	1
8775(5/16)	4-64	1
8777	4-254	5
	8-2	
	10-50	
	10-58A	
8780	6-54	2
8791(20)	3-117	5
	3-146	
	3-182	
8791(4)	3-148	2
	3-183	
8791(7)	3-149	1
8796(120)	3-13	21
	3-88	
	3-118	
	3-159	
	3-171	
	3-184	
	3-201	
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8797(200)	5-5	1
8797(300)	3-200	1
8826	5-19	3

Part No.	Figure & Index No.	Total Quantity
8826 (cont)	6-74	
8832	3-107	12
	3-144	
	4-117	
	4-141	
	4-161	
8835	4-81	10
	4-92	
	4-94	
	4-251	
	4-255	
	5-4	
	5-8	
	6-73	
8836	5-3	2
	5-13	
8837	4-73	18
	4-199	
	4-243	
8848	4-75	2
	4-78	
8862	7-26	1
8870(100)	4-128	2
	4-252	
8870(240)	3-128	2
8870(51)	3-110	11
	3-125	
	3-170	
	4-121	
	4-138	
	4-241	
	5-27	
8872(0.22)	4-164	1
8874(7V)	5-20	1
8870(0.68)	3-89	4
	3-138	
	4-108	
8877(1.0)	3-11	4
	3-131	
	3-185	
8877(15)	4-96	2
	4-145	
8877(3.3)	3-161	2
	4-124	
8879(0.39)	4-150	1
8879(0.82)	4-77	1
8890(0.022)	4-255	1
8891-9102	10-58A	1
8897	8-7	5
	10-37	
8908(2200)	4-246	1
8915(100K)	5-19A	1
8915(500K)	6-74A	1

Part No.	Figure & Index No.	Total Quantity
8920(150)	10-17	1
8927-0004	10-74	2
8937(50K)	6-37A	2
	6-69A	
8940(0001)	9-1	1
8940(0002)	9-2	1
8940(0003)	9-6	1
8940(0004)	9-8	1
8940(0005)	(9-)	1
8940(0006)	(9-)	1
8940(0007)	9-9	2
8940(0008)	9-13	1
8940(0009)	9-14	2
8940(0010)	9-15	2
8940(0011)	9-15	2
8940(0012)	9-16	1
8940(0013)	9-18	1
8940(0014)	9-20	1
8940(0015)	9-22	1
8940(0016)	9-23	1
8940(0017)	(9-)	1
8940(0018)	9-26	4
8940(0019)	9-27	2
8940(0020)	9-28	2
8940(0021)	9-29	1
8940(0022)	9-31	1
8940(0023)	9-33	2
8940(0024)	9-35	1
8940(0025)	9-37	AR
8940(0026)	9-38	AR
8940(0027)	9-39	AR
8940(0028)	9-40	1
8940(0029)	9-41	1
8940(0030)	9-41	1
8940(0031)	9-43	2
8940(0032)	9-44	1
8940(0033)	9-44	1
8940(0034)	9-45	1
8940(0035)	9-46	1
8940(0036)	9-46	1
8946(20)	10-20	2
	10-66D	
8946(36)	10-20	2
	10-66	
8950-0040	10-33	3
	10-56	
8964(1K)	4-210A	1
8996-9102	10-19	1
8996-9473	10-16	1
9327	8-10	2
	10-41	
9391	6-83	1
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SECTION IV

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Y315	4-45	19658(60.15)
Y316	4-45	19658(60.65)
Y317	4-45	19658(61.15)
Y318	4-45	19658(61.65)
Z101	3-1	20806
Z701	8-12	20894
Z801	10-8	23806
Z802	10-43	20894

DIFFERENCE DATA

FOR

CESSNA TRANSCEIVER 800 (Part Number 27610-0028)

(Supplement to Cessna Transceiver 800 Part Number 19300-1028)

CESSNA AIRCRAFT COMPANY

WICHITA, KANSAS

DIFFERENCE DATA

for

ARC TYPE 210D

VHF COMMUNICATION EQUIPMENT

INTRODUCTION

This supplement to the instruction book for the ARC Type 210 VHF Communication Equipment contains difference data for the ARC Type 210D VHF Communication Equipment. The major units of the Type 210D are the ARC Type RT-11D Receiver-Transmitter, the ARC Type C-67D Control Unit or CC-10D Control Unit, and the ARC Type DV-15A Dynaverter® Information for the DV-15A is contained in another supplement to the basic instruction book.

All information in the basic instruction book for the ARC Type RT-11A Receiver-Transmitter and the ARC Type C-67A Control Unit is relatively applicable to the similar units covered by this supplement, except where specific differences are noted.

Paragraph numbers and headings, and figure numbers in this supplement follow the same sequence as in the basic instruction book. An omission of a paragraph heading or illustration indicates that the basic information applies.

SECTION I

GENERAL INFORMATION

1-1. PURPOSE.

The Type 210D equipment has an increased frequency coverage of 116.00 to 135.95 mc, providing 400 channels.

1-2. SPECIFICATIONS.

General Characteristics.

Frequency: 116.00 to 135.95 mc

Number of Channels: 400

Input Power: Receive - 3.6 amperes at 27.5 volts dc
6.3 amperes at 13.5 volts dc

Transmit - 5.8 amperes at 27.5 volts dc
10.2 amperes at 13.5 volts dc

Total Weight: 20.3 pounds

Environmental Limit: Meets FAA TSO C-37a and TSO C-38a, Category A, and MIL Specification MIL-T-5422 for temperature, humidity, vibration, shock, and altitude (50,000 feet)

RT-11D Receiver-Transmitter.

Transmitter Section.

Power Output: 18 watts nominal

Tuning: Automatic, crystal-controlled. Twenty crystals on transmitter megacycle drum; fundamental frequency range 53.025 - 62.525 mc in 0.5-mc steps. Twenty crystals on fractional megacycle drum (shared with receiver); frequency range 9.95 - 10.90 mc

Receiver Section.

Tuning: Automatic, crystal-controlled. Twenty crystals on receiver megacycle drum; fundamental frequency range 52.175 - 61.675 mc in 0.5-mc steps. Twenty crystals on fractional megacycle drum (shared with transmitter); frequency range 9.95 - 10.90 mc

C-67D Control Unit.

Weight: 1.8 pounds

Dimensions: 5-3/4 inches wide, 2-1/4 inches high, 5-15/16 inches deep overall, 4-9/16 inches deep behind front panel

CC-10D Control Unit.

Weight: 1.25 pounds

Dimensions: 2-7/8 inches wide, 2-3/8 inches high, 5-5/8 inches deep overall, 4-3/8 inches deep behind front panel

DV-15A Dynaverter.

Receive Condition: Input - 13.75 volts dc, 2.0 amperes or 27.5 volts dc, 1.2 amperes. Outputs - 235 volts dc, 46 ma and 120 volts dc, 42 ma

Transmit Condition: Input - 13.75 volts dc, 6.5 amperes or 27.5 volts dc, 3.6 amperes. Outputs - 360 volts dc, 200 ma and 110 volts dc, 48 ma

Mounting Required: ARC Type M-32A

Weight: 3.8 pounds; 4.1 pounds including mounting

Dimensions: 5-7/16 inches wide, 4-3/8 inches high, 8-1/32 inches long overall, including mounting

1-3. UNITS SUPPLIED.

The units and accessories which comprise the Type 210D are listed in Table 1-1A.

TABLE 1-1A. UNITS SUPPLIED

Qty	Name	ARC Part No.
	MAJOR UNITS	
1	Receiver-Transmitter ARC Type RT-11D[1]	27610
1	Control Unit ARC Type C-67D[2]	28010
1	Control Unit ARC Type CC-10D	28070
1	Dynaverter ARC Type DV-15A[1]	22560
1	Mounting ARC Type M-31A	20660
1	Mounting ARC Type M-32A	21455

TABLE 1-1A. UNITS SUPPLIED - Continued

Qty	Name	ARC Part No.
	ACCESSORIES	
1	Set of Connectors, consisting of:	
1	Connector, plug	14052
2	Connector, plug	15912
2	Connector, plug	14843
1	Connector, plug	16210
2	Connector, coaxial UG-88C/U	11337
AR	Cable, coaxial (RG-58/U)	11318(*)[3]

[1]The RT-11D and DV-15A are supplied in either a 14-volt or a 28-volt model.
[2]Only one control unit is supplied, as specified. The C-67D and CC-10D are furnished with 28-volt pilot lamps installed and with 14-volt lamps as accessories.
[3]In place of asterisk (*), cable length in feet and inches is specified to complete part number.

1-5. PARTS FOR CUSTOM CONTROL PANEL.

If a CC-10D Control Unit is used in place of the C-67D Control Unit, the following additional parts are required (for installation refer to paragraph 2-2 of this supplement):

Qty	Name	ARC Part No.
1	Volume Control and Switch Assembly	8862
1	Knob Assembly	16331
1	Lockwasher	8540
1	Nut	4697

1-6. DESCRIPTION.

Receiver-Transmitter. Internally, the RT-11D is similar to the RT-11A except for the transmitter and receiver megacycle crystal drums and their associated wiring. The RT-11D transmitter and receiver megacycle crystal drums each have 20 crystals installed in 20-position drums with the crystals arranged around the drums in a frequency pattern similar to that used for the fractional megacycle crystal drum. The RT-11D has the same overall dimensions as the RT-11A and requires the same mounting. However, a different keyway is used in J206 of the RT-11D to prevent interchanging units.

Control Unit. An ARC Type C-67D or CC-10D Control Unit is required to operate the RT-11D. The C-67D differs from the C-67A in that its megacycle channel selector switch has 20 positions and it selects frequencies from 116 to 135 mc. J601 in the C-67D has a different keyway from J601 in the C-67A to prevent interchanging units.

The CC-10D Control Unit is used for custom installations in place of the C-67D Control Unit. It is designed for frequency selection only. An external power on-off switch and volume control is required.

Dynaverter. Refer to the DV-15A Supplement to the basic instruction book.

SECTION II

INSTALLATION

2-1. CABLE FABRICATION.

The interconnection diagrams for the Type 210D Equipment are shown in Figure 2-11B, which replaces Figure 2-11, and Figure 2-11C. Figure 2-12 is not applicable.

2-2. INSTALLATION.

Installation of C-67D. The installation dimensions shown in Figure 2-3 for the C-67A are applicable to the C-67D except that the depth of the unit behind the front panel (not including the connector) is 4-5/32 inches instead of 2-1/8 inches, and the overall depth is 5-17/32 inches instead of 3-1/2 inches.

Installation of CC-10D. Installation dimensions and assembly details for the CC-10D are shown in Figures 2-3A and 2-3B. The mounting dimensions for the external volume control and power switch are shown in Figure 2-6 of the basic instruction book.

Installation of DV-15A. Refer to the DV-15A Supplement.

Installation of Custom Control Parts. This paragraph is not applicable to the Type 210D since Channel Selector Switch Assembly ARC-20730 cannot be used with the RT-11D Receiver-Transmitter. Figures 2-6 through 2-10 are not applicable to the Type 210D.

2-3. OPTIONAL REMOTE SQUELCH CONTROL.

If a remote squelch control is to be installed with the RT-11D, use a 100,000-ohm linear taper potentiometer connected as shown in Figure 2-11B or 2-11C.

SECTION III

OPERATION

3-1. OPERATING CONTROLS.

The information given in Table 3-1 is applicable to the Type 210D, except that the C-67D and CC-10D megacycle channel selector switch selects megacycle frequencies from 116 to 135 mc.

SECTION IV

PRINCIPLES OF OPERATION

Except for the modifications described in the preceding paragraphs of this supplement, the information contained in this section is applicable to the relative units covered by this supplement.

Schematic diagrams of the RT-11D Receiver-Transmitter, C-67D Control Unit, and CC-10D Control Unit are shown in Figures 6-1C, 6-19B, and 6-21C of this supplement.

SECTION V

MAINTENANCE

5-6. TROUBLE ANALYSIS.

For the RT-11D, the "Channeling Trouble Analysis with BTK-210" paragraph is applicable only if an external control unit, such as the C-67D, is used with the BTK-210. When using the BTK-210 and C-67D, the panel lamp indications on the H-22A Transceiver Test Panel will be those listed in Table 5-5B.

Figures 5-8 and 5-9 are applicable for use with the RT-11D and C-67D, except that ARC-14843 connectors are used for J206 of the RT-11D and J601 of the C-67D instead of ARC-16115 connectors.

5-10. TRANSMITTER ALIGNMENT AND ADJUSTMENT.

The adjustment and alignment procedures given in this paragraph are applicable to the RT-11D transmitter assembly except that all references in the text to "118 mc" are "116 mc" for the RT-11D.

5-12. RECEIVER ALIGNMENT AND ADJUSTMENT.

The adjustment and alignment procedures given in this paragraph are applicable to the RT-11D receiver assembly except that all references in the text to "118 mc" are "116 mc" for the RT-11D.

TABLE 5-5B. BTK-210 LAMP INDICATIONS FOR CONTINUITY CHECKS OF C-67D CHANNEL SELECTOR SWITCHES

Switch Position	MEGACYCLE CHANNEL			FRACTIONAL MEGACYCLE CHANNEL	
	TRANS CYCLING Lamps		REC CYCLING Lamps	Switch Position	FRACT CYCLING Lamps
	SCS	DCS	SCS or DCS		
116	B, C	E	K, L	.00	N, O
117	A, B, E	B, D	J, K, L	.05	N, O, P
118	C, D	A	H, L	.10	N, R
119	A, D	A, C, E	I, J, K, L	.15	N, O, P, Q
120	D, E	B	I	.20	Q
121	C, E	B, D, E	H, I, J, K	.25	O, P, Q, R
122	E	C	J	.30	P
123	B, D	C, D, E	H, I, J, L	.35	N, P, Q, R
124	A	D	K	.40	O
125	A, C, E	B, C, D, E	H, I, K	.45	O, Q, R
126	B	A, E	L	.50	N
127	B, D, E	A, B, C, D	H, J, L	.55	N, P, R
128	C	A, B	H	.60	R
129	C, D, E	A, B, C	I, K	.65	O, Q
130	D	B, C	H, I	.70	Q, R
131	B, C, D, E	A, B, E	H, J	.75	P, R
132	A, E	C, D	I, J	.80	P, Q
133	A, B, C, D	A, D	I, L	.85	N, Q
134	A, B	D, E	J, K	.90	O, P
135	A, B, C	C, E	H, K, L	.95	N, O, R

Note: Letters refer to illuminated lamps only. Letters also indicate grounded control wire terminals of J601 in C-67D and J206 in RT-11D.

SECTION VI

DIAGRAMS

FIGURE 6-1C.

A schematic diagram of the RT-11D Receiver-Transmitter is shown in Figure 6-1C.

Some production units of the RT-11D Receiver-Transmitter may use crystal frequencies (listed below) which are different from those listed on Figure 6-1C or referenced in the text of this supplement. The use of these frequencies has no effect on overall operation of the RT-11D. Before replacing any crystal, check the frequency stamped on the holder and select a replacement crystal of the same frequency either from the following table or from the table of Figure 6-1C.

Ref Desig	Frequency MC	ARC Part No.
Y101	53.000	19658-5300
Y102	54.000	19658-5400
Y103	55.000	19658-5500
Y104	56.000	19658-5600
Y105	57.000	19658-5700
Y106	58.000	19658-5800
Y107	59.000	19658-5900
Y108	60.000	19658-6000
Y109	61.000	19658-6100
Y110	62.000	19658-6200
Y111	62.500	19658-6250
Y112	61.500	19658-6150
Y113	60.500	19658-6050
Y114	59.500	19658-5950
Y115	58.500	19658-5850
Y116	57.500	19658-5750
Y117	56.500	19658-5650
Y118	55.500	19658-5550
Y119	54.500	19658-5450
Y120	53.500	19658-5350
Y121	10.00	19657-1000
Y122	10.10	19657-1010
Y123	10.20	19657-1020
Y124	10.30	19657-1030
Y125	10.40	19657-1040
Y126	10.50	19657-1050
Y127	10.60	19657-1060
Y128	10.70	19657-1070
Y129	10.80	19657-1080
Y130	10.90	19657-1090

Ref Desig	Frequency MC	ARC Part No.
Y131	10.95	19657-1095
Y132	10.85	19657-1085
Y133	10.75	19657-1075
Y134	10.65	19657-1065
Y135	10.55	19657-1055
Y136	10.45	19657-1045
Y137	10.35	19657-1035
Y138	10.25	19657-1025
Y139	10.15	19657-1015
Y140	10.05	19657-1005
Y301	52.150	19658-5215
Y302	53.150	19658-5315
Y303	54.150	19658-5415
Y304	55.150	19658-5515
Y305	56.150	19658-5615
Y306	57.150	19658-5715
Y307	58.150	19658-5815
Y308	59.150	19658-5915
Y309	60.150	19658-6015
Y310	61.150	19658-6115
Y311	61.650	19658-6165
Y312	60.650	19658-6065
Y313	59.650	19658-5965
Y314	58.650	19658-5865
Y315	57.650	19658-5765
Y316	56.650	19658-5665
Y317	55.650	19658-5565
Y318	54.650	19658-5465
Y319	53.650	19658-5365
Y320	52.650	19658-5265

FIGURE 6-2B.

A wiring diagram of the RT-11D Receiver-Transmitter is shown in Figure 6-2B.

FIGURE 6-3B.

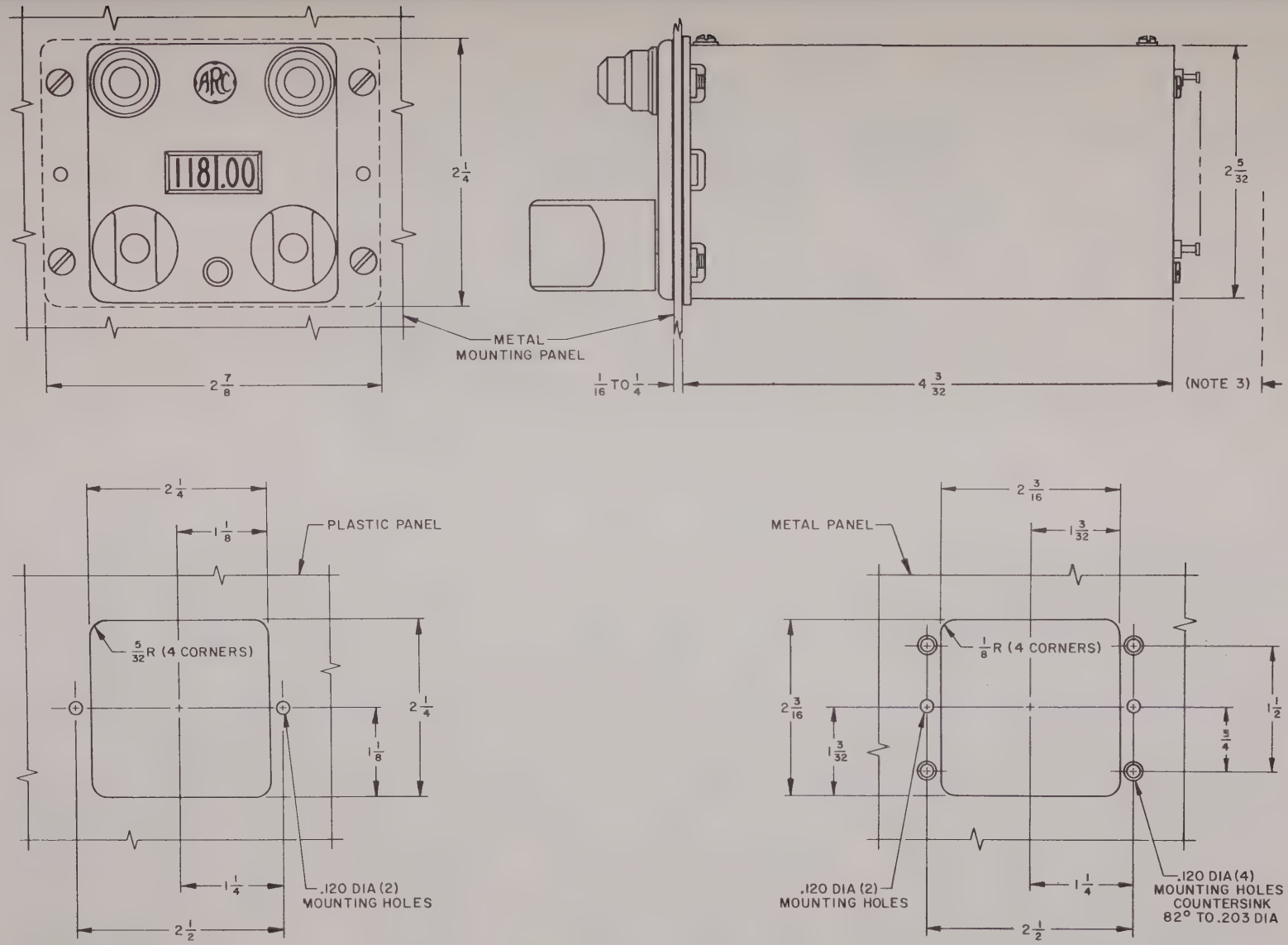
Modification of the receiver assembly wiring diagram of the RT-11A Receiver-Transmitter (Figure 6-3) as applicable to the RT-11D Receiver-Transmitter is shown in Figure 6-3B.

FIGURE 6-12B.

Modification of the transmitter assembly wiring diagram of the RT-11A Receiver-Transmitter (Figure 6-12) as applicable to the RT-11D Receiver-Transmitter is shown in Figure 6-12B.

FIGURES 6-19B, 6-20B, 6-21B, 6-21C, AND 6-21D.

A schematic diagram and a wiring diagram of the C-67D Control Unit are shown in Figures 6-19B and 6-20B, respectively. A continuity sequence table for the C-67D Control Unit is shown in Figure 6-21B. Schematic and wiring diagrams for the CC-10D Control Unit are shown in Figures 6-21C and 6-21D.



NOTES:

1. DIMENSIONS ARE IN INCHES.
2. WEIGHT: 1.2 POUNDS.
3. ALLOW 1/2 INCH FOR TERMINAL CLEARANCE.

TP3415

Figure 2-3A. ARC Type CC-10D Control Unit, Installation Dimensions

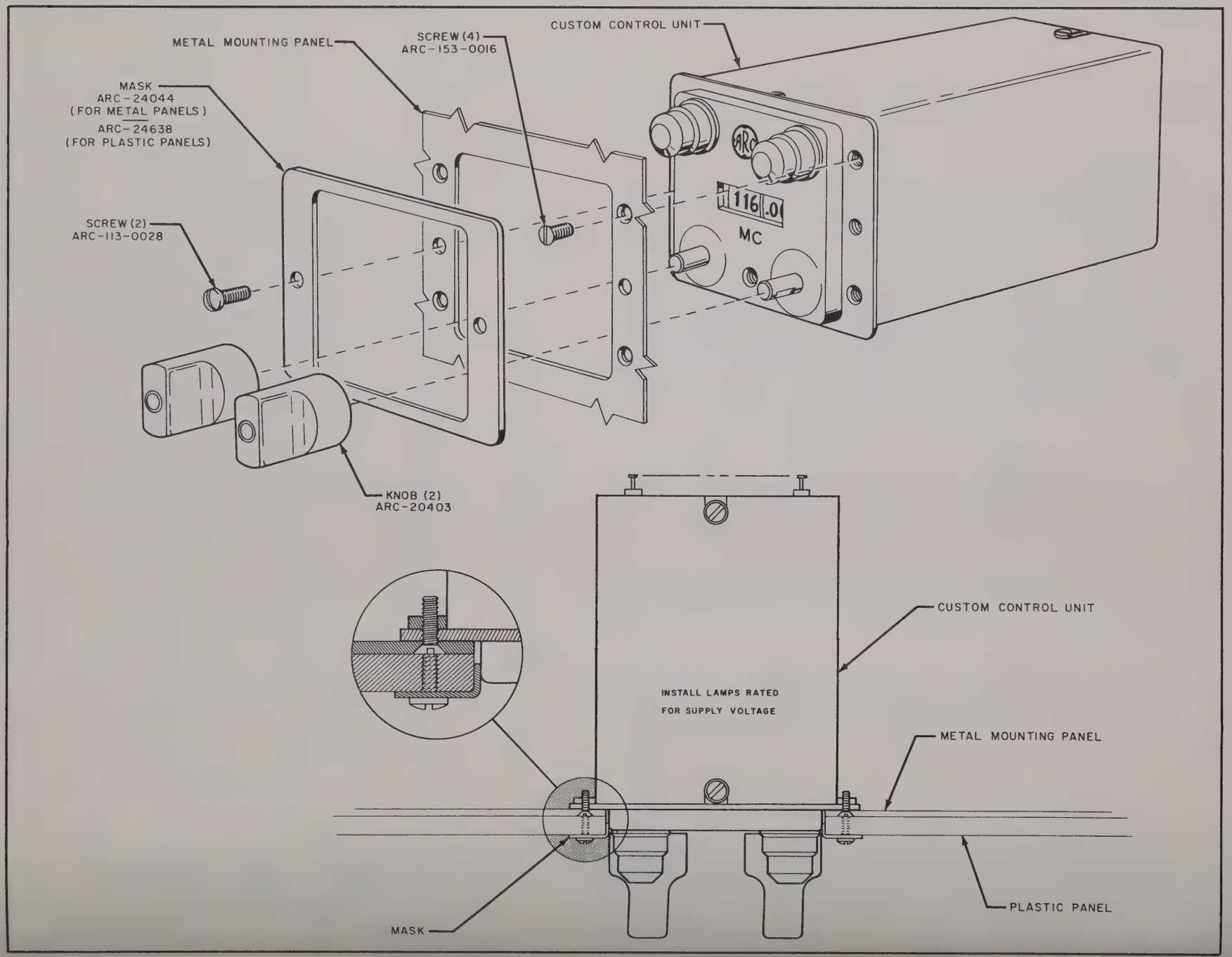
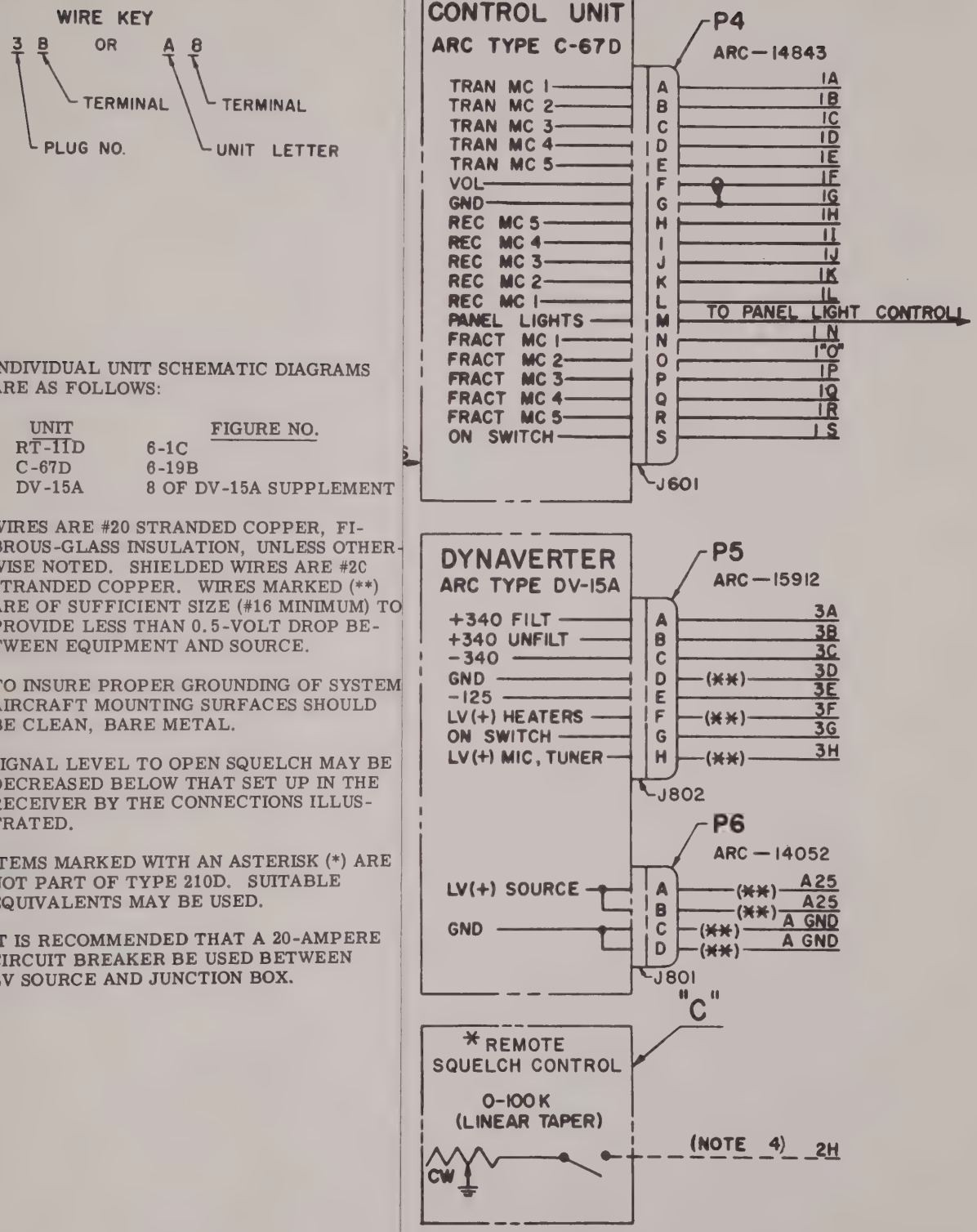


Figure 2-3B. ARC Type CC-10D Control Unit, Assembly Details

TP3417



NOTES:

1. INDIVIDUAL UNIT SCHEMATIC DIAGRAMS ARE AS FOLLOWS:

UNIT	FIGURE NO.
RT-11D	6-1C
C-67D	6-19B
DV-15A	8 OF DV-15A SUPPLEMENT

2. WIRES ARE #20 STRANDED COPPER, FIBROUS-GLASS INSULATION, UNLESS OTHERWISE NOTED. SHIELDED WIRES ARE #20 STRANDED COPPER. WIRES MARKED (**) ARE OF SUFFICIENT SIZE (#16 MINIMUM) TO PROVIDE LESS THAN 0.5-VOLT DROP BETWEEN EQUIPMENT AND SOURCE.

3. TO INSURE PROPER GROUNDING OF SYSTEM AIRCRAFT MOUNTING SURFACES SHOULD BE CLEAN, BARE METAL.

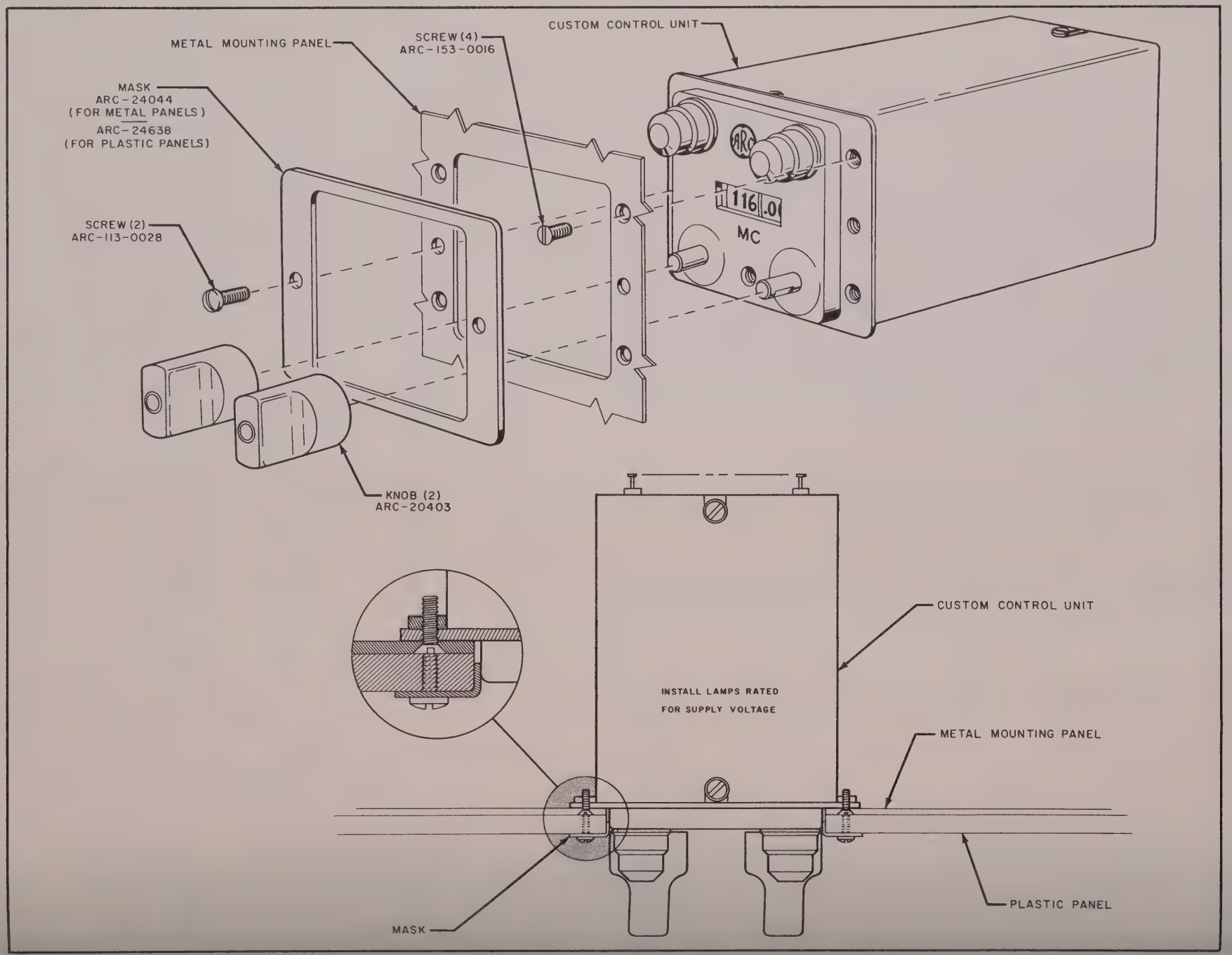
4. SIGNAL LEVEL TO OPEN SQUELCH MAY BE DECREASED BELOW THAT SET UP IN THE RECEIVER BY THE CONNECTIONS ILLUSTRATED.

5. ITEMS MARKED WITH AN ASTERISK (*) ARE NOT PART OF TYPE 210D. SUITABLE EQUIVALENTS MAY BE USED.

6. IT IS RECOMMENDED THAT A 20-AMPERE CIRCUIT BREAKER BE USED BETWEEN LV SOURCE AND JUNCTION BOX.

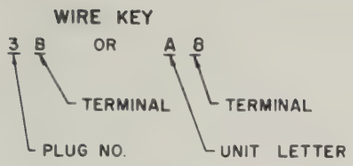
28120A

igure 2-11B. ARC Type 210D VHF Communication Equipment with C-67D Control Unit, Interconnection Diagram



TP3417

Figure 2-3B. ARC Type CC-10D Control Unit, Assembly Details



NOTES:

1. INDIVIDUAL UNIT SCHEMATIC DIAGRAMS ARE AS FOLLOWS:

UNIT	FIGURE NO.
RT-11D	6-1C
C-67D	6-19B
DV-15A	8 OF DV-15A SUPPLEMENT

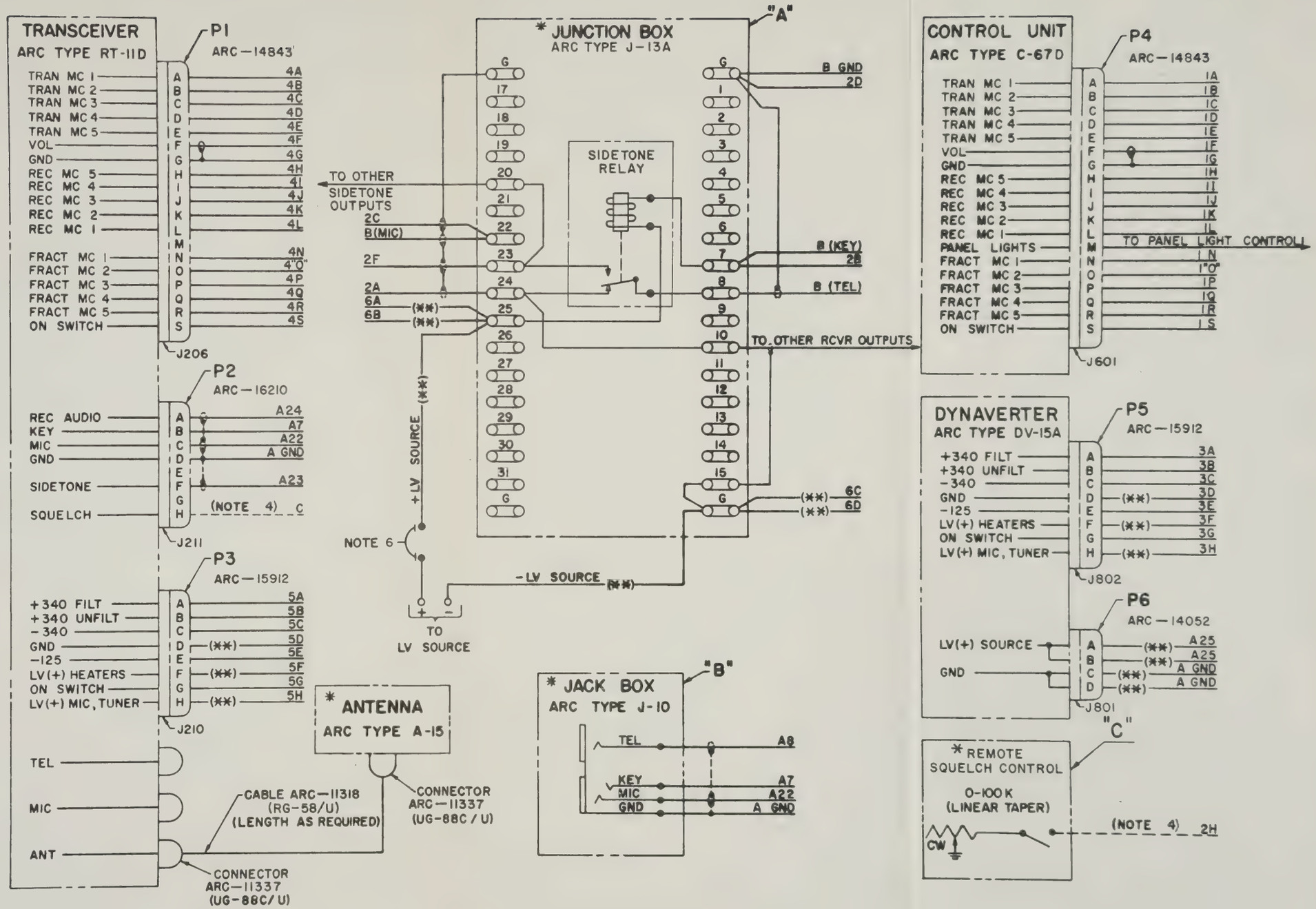
2. WIRES ARE #20 STRANDED COPPER, FIBROUS-GLASS INSULATION, UNLESS OTHERWISE NOTED. SHIELDED WIRES ARE #20 STRANDED COPPER. WIRES MARKED (**) ARE OF SUFFICIENT SIZE (#16 MINIMUM) TO PROVIDE LESS THAN 0.5-VOLT DROP BETWEEN EQUIPMENT AND SOURCE.

3. TO INSURE PROPER GROUNDING OF SYSTEM, AIRCRAFT MOUNTING SURFACES SHOULD BE CLEAN, BARE METAL.

4. SIGNAL LEVEL TO OPEN SQUELCH MAY BE DECREASED BELOW THAT SET UP IN THE RECEIVER BY THE CONNECTIONS ILLUSTRATED.

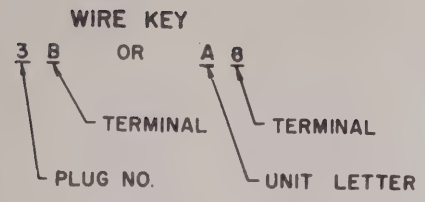
5. ITEMS MARKED WITH AN ASTERISK (*) ARE NOT PART OF TYPE 210D. SUITABLE EQUIVALENTS MAY BE USED.

6. IT IS RECOMMENDED THAT A 20-AMPERE CIRCUIT BREAKER BE USED BETWEEN LV SOURCE AND JUNCTION BOX.



28120A

Figure 2-11B. ARC Type 210D VHF Communication Equipment with C-67D Control Unit, Interconnection Diagram



NOTES:

1. INDIVIDUAL UNIT SCHEMATIC DIAGRAMS ARE AS FOLLOWS:

UNIT	FIGURE NO.
RT-11D	6-1C
CC-10D	6-21C
DV-15A	8 OF DV-15A SUPPLEMENT

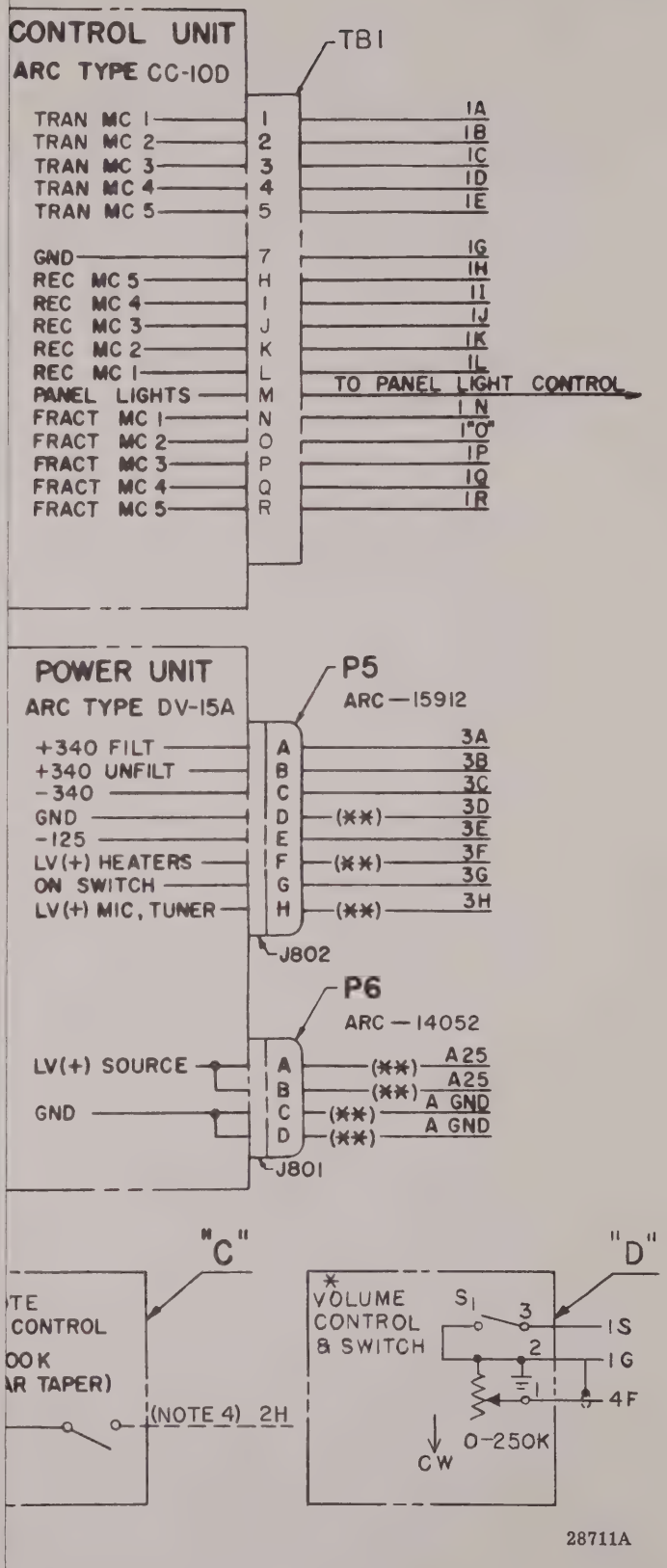
2. WIRES ARE #20 STRANDED COPPER, FIBROUS-GLASS INSULATION, UNLESS OTHERWISE NOTED. SHIELDED WIRES ARE #20 STRANDED COPPER. WIRES MARKED (**) ARE OF SUFFICIENT SIZE (#16 MINIMUM) TO PROVIDE LESS THAN 0.5-VOLT DROP BETWEEN EQUIPMENT AND SOURCE.

3. TO INSURE PROPER GROUNDING OF SYSTEM, AIRCRAFT MOUNTING SURFACES SHOULD BE CLEAN, BARE METAL.

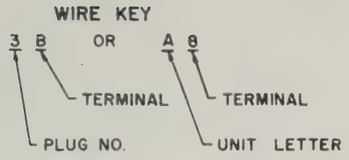
4. SIGNAL LEVEL TO OPEN SQUELCH MAY BE DECREASED BELOW THAT SET UP IN THE RECEIVER BY THE CONNECTIONS ILLUSTRATED.

5. ITEMS MARKED WITH AN ASTERISK (*) ARE NOT PART OF TYPE 210D. SUITABLE EQUIVALENTS MAY BE USED.

6. IT IS RECOMMENDED THAT A 20-AMPERE CIRCUIT BREAKER BE USED BETWEEN LV SOURCE AND JUNCTION BOX.



igure 2-11C. ARC Type 210D VHF Communication Equipment with CC-10D Control Unit, Interconnection Diagram



NOTES:

1. INDIVIDUAL UNIT SCHEMATIC DIAGRAMS ARE AS FOLLOWS:

UNIT	FIGURE NO.
RT-11D	6-1C
CC-10D	6-21C
DV-15A	8 OF DV-15A SUPPLEMENT

2. WIRES ARE #20 STRANDED COPPER, FIBROUS-GLASS INSULATION, UNLESS OTHERWISE NOTED. SHIELDED WIRES ARE #20 STRANDED COPPER. WIRES MARKED (**) ARE OF SUFFICIENT SIZE (#16 MINIMUM) TO PROVIDE LESS THAN 0.5-VOLT DROP BETWEEN EQUIPMENT AND SOURCE.

3. TO INSURE PROPER GROUNDING OF SYSTEM, AIRCRAFT MOUNTING SURFACES SHOULD BE CLEAN, BARE METAL.

4. SIGNAL LEVEL TO OPEN SQUELCH MAY BE DECREASED BELOW THAT SET UP IN THE RECEIVER BY THE CONNECTIONS ILLUSTRATED.

5. ITEMS MARKED WITH AN ASTERISK (*) ARE NOT PART OF TYPE 210D. SUITABLE EQUIVALENTS MAY BE USED.

6. IT IS RECOMMENDED THAT A 20-AMPERE CIRCUIT BREAKER BE USED BETWEEN LV SOURCE AND JUNCTION BOX.

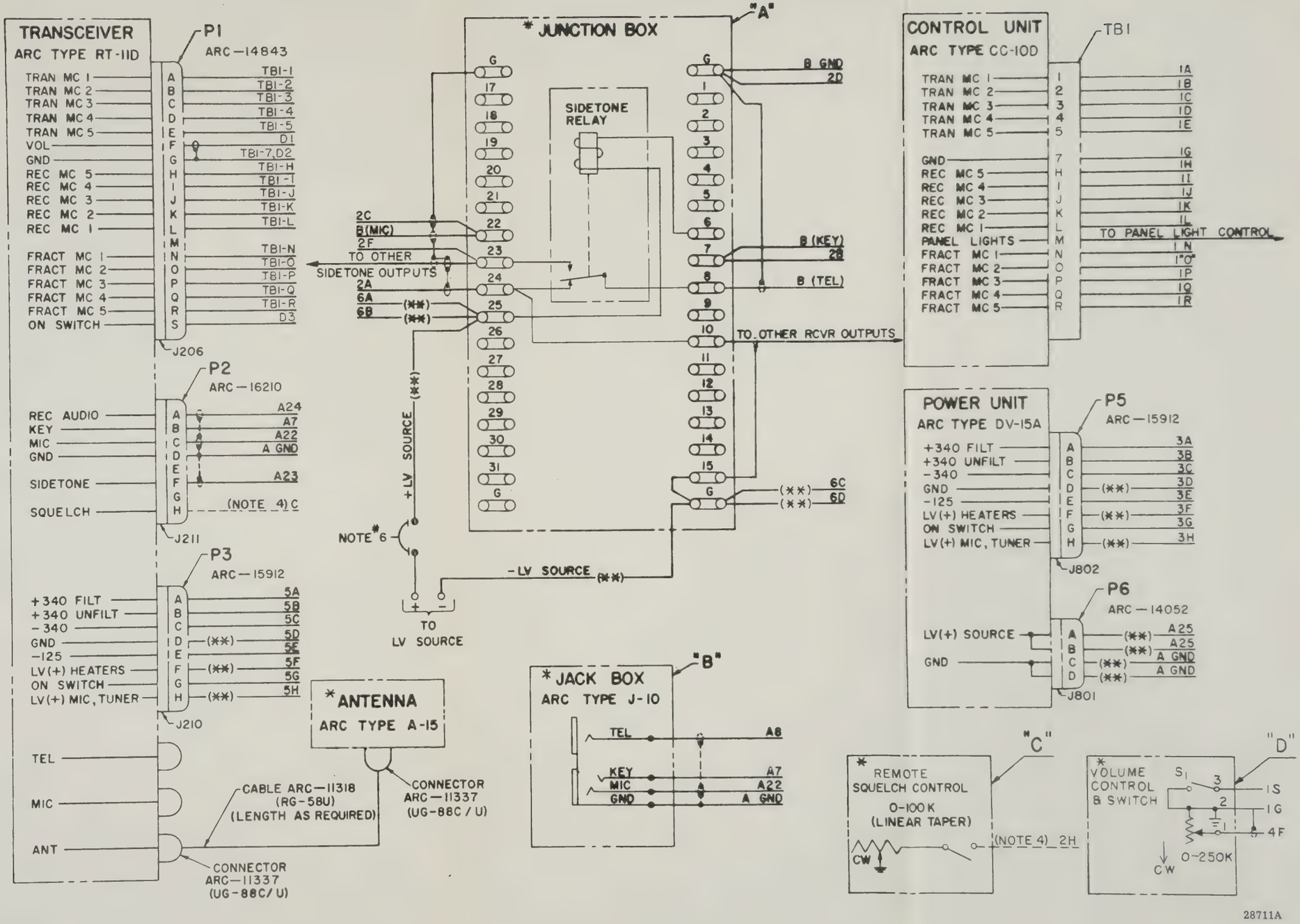


Figure 2-11C. ARC Type 210D VHF Communication Equipment with CC-10D Control Unit, Interconnection Diagram

ARC PART NUMBERS FOR FIGURE 6-1C.

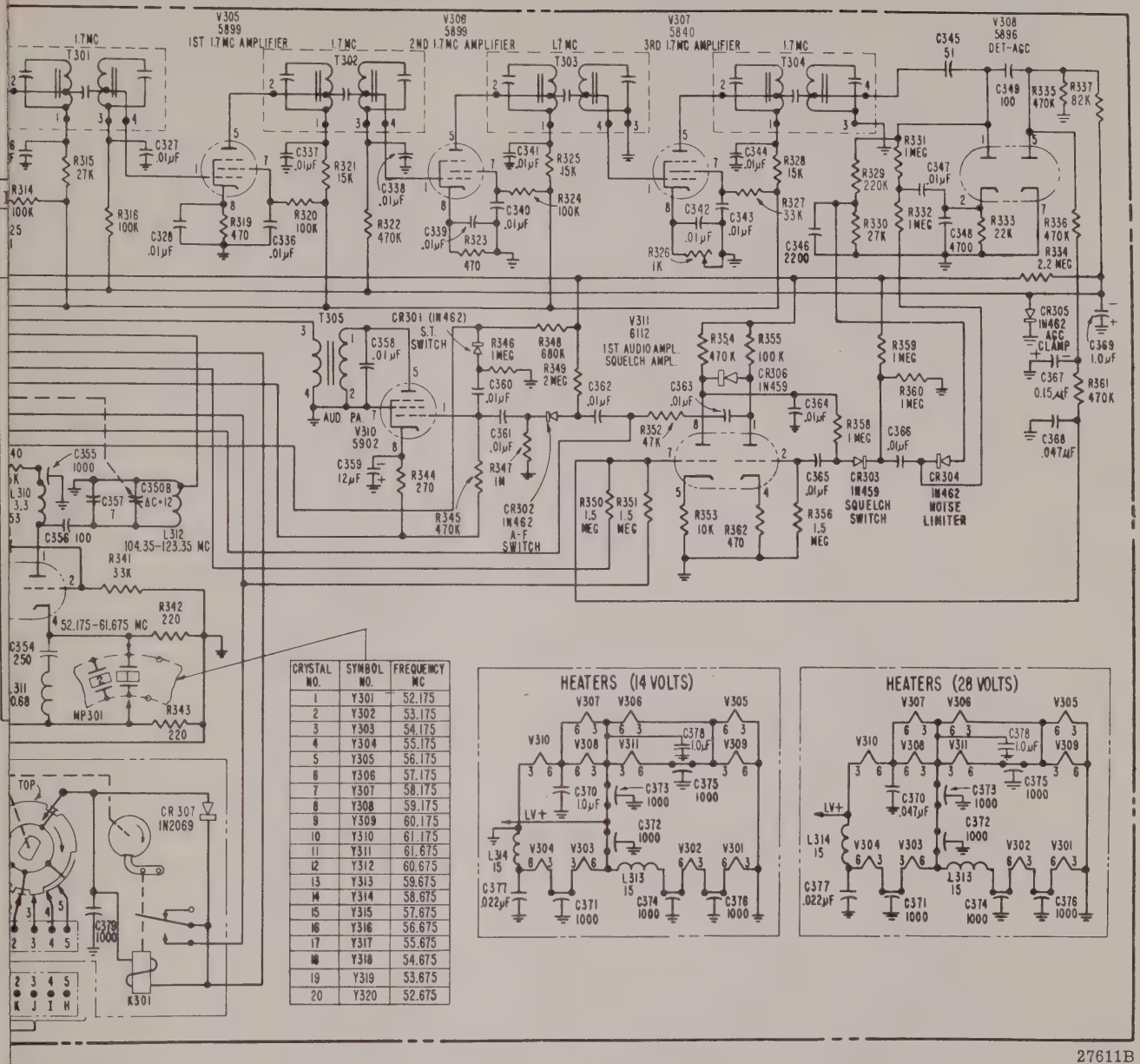
Reference Designation	ARC Part No.
A101	27730(*)
A102	19660(*)
A201	27709(*)
A301	27720(*)
A302	19990(*)
A401	20360
A501	19544(*)
B501	18800
B501	18801
C101	8796(120)
C102	8870(51)
C103	8791(20)
C104	8870(51)
C105	8832
C106	19603
C107	21326(12)
C108	8765(24)
C109	8765(24)
C110	8870(51)
C111	8765(24)
C112	8765(24)
C113	8870(240)
C114	8870(240)
C115	8791(20)
C116	8791(20)
C117	8870(51)
C118	21326(6)
C119	8832
C120	8791(4)
C121	8791(7)
C122	8832
C123	8627(.022)
C124	8796(120)
C125	8870(51)
C126	8870(51)
C127	8796(120)
C128	8796(120)
C129	21326(12)
C130	8796(120)
C131	8796(120)
C132	8796(120)
C133	8791(4)
C134	19639(6)
C135	8791(20)
C136	8791(20)
C137	8796(120)
C138	8796(120)
C139	8796(120)
C140	8796(120)
C142	8796(120)
C143	19420(4)
C144	8797(300)
C145	8832
C146	8796(120)
C147	8832
C148	8796(120)
C149	8832
C150	8796(120)
C151	8796(120)
C152	8795(2.0)
C153	8625(1000)
C201	8835(.01)
C202	20666
C203	23943
C204	23943
C205	8796(120)
C206	8756(.47)
C207	8796(120)
C208	8627(.022)
C209	8627(.022)
C210	8627(.022)
C211	24541(150)
C212	8627(.022)
C213	8627(.01)
C214	24541(150)
C215	24541(150)
C216	8627(.022)
C217	8627(.01)
C218	24541(150)
C219	24541(150)
C220	24541(150)
C221	24541(150)
C222	24541(150)
C223	24541(150)
C301	14143
C302	19929(12)
C303	8363
C304	8765(10)
C305	19929(12)
C306	8541
C307	14143
C308	19897(10)
C309	8879(0.39)
C310	8832
C311	8363
C312	14143
C314	8278
C315	8870(51)
C316	19946(8)
C317	8837
C318	8832
C319	8848
C320	8879(0.82)
C321	8848
C322	8278
C323	8554
C324	19946(8)
C325	26825(2200)
C326	8835
C327	8835
C328	8837
C336	8837
C337	8837
C338	8837
C339	8837
C340	8837
C341	8837
C342	8837
C343	8837
C344	8837
C345	8870(51)
C346	8908(2200)
C347	8835
C348	8626(4700)
C349	8870(100)
C350	19929(12)
C351	19603
C352	8870(51)
C353	8870(51)
C354	8535
C355	8832
C356	8870(100)
C357	8765(7.0)
C358	8835
C359	8777
C360	8837
C361	8837
C362	8837
C363	8837
C364	8837
C365	8837
C366	8837
C367	21485(.15)
C368	21965
C369	21485(1)
C370	21485(1)
C371	14143
C372	8832
C373	14143
C374	8832
C375	14143
C376	8832
C377	8627(.022)
C378	21485(1)
C379	8625(1000)
C401	8796(120)
C402	8796(120)
C403	8835
C404	8836
C405	8836
C406	8908(510)
C407	8835
C408	8617
C409	8617
C410	8835
C411	8835
C412	8870(51)
CR201	19663
CR202	23037
CR301	23037
CR302	23037
CR303	17953
CR304	23037
CR305	23037
CR306	23037
CR307	8931-0201
CR401	8874
E101	19609
E102	19609
J101	19669
J102	19336
J103	19669
	19661
J104	19336
J105	19323
J106	19392
J201	19329
J202	19329
J203	19329
J204	19329
J205	19331
J206	27715
J207	19896
	19315
J208	19896
	19315
J209	19896
	19315
J210	12348
J211	12355
J212	7565
J213	9391
J214	19308
J215	19308
J301	20302
J302	19336
K101	19664
	19665
K102	19664
	19665
K201	19896
	19315
K202	19662
	17635
K301	19664
	19665
L101	8877(0.68)
L102	19620
L103	19923
L104	8877(1.0)
L105	8877(1.0)
L106	14141
L107	14141
L108	8877(.68)
L109	8877(.68)
L110	19619
L111	15174
L112	14141
L113	19620
L114	8877(1.0)
L115	19617
L116	14141
L117	14141
L118	19616
L119	15174
L120	19370
L121	8877(1.0)
L301	19924
L302	8877(0.22)
L303	19921
L304	19922
L305	19715
L306	19715
L309	19923
L310	8877(3.3)
L311	8877(0.68)
L312	19920
L313	8877(15)
L314	8877(15)
MP101	p/o A102
MP102	p/o A102
MP301	p/o A302
P101	19422
P102	19422
P103	19422
P104	19422
P105	19630
P106	19609
P107	19609
P201	20472
P202	4628
P203	19339
P204	19342
P205	19339
P206	20472
P207	20471
P208	19339
P209	20471
P210	19609
P211	19609
P301	19952
P401	19952
P501	19546
R101	200(220)
R102	200(220)
R103	204(10)
R104	200(33K)
R105	201(33K)
R106	201(20K)
R108	200(22K)
R109	200(22K)
R110	200(100K)
R111	200(39K)
R112	200(1K)
R113	200(1K)
R114	200(1K)
R115	200(560)
R116	200(33K)
R117	201(150)
R118	201(10K)
R119	201(1K)
R120	201(220)

ARC PART NUMBERS FOR FIGURE 6-1C. - Continued

Reference Designation	ARC Part No.
R121	201(10K)
R122	201(22K)
R123	201(1K)
R124	201(22K)
R125	203(150)
R126	202(8200)
R127	201(4700)
R128	201(47)
R129	200(4700)
R201	209(126)
R202	203(6800)
R203	203(1K)
R204	200(4700)
R205	200(10K)
R206	8915(500K)
R207	203(4700)
R208	203(4700)
R209	203(47K)
R210	201(220)
R211	8937(50K)
R212	201(110)
R213	203(15K)
R214	201(110)
R215	210(9.7)
R216	209(126)
R217	209(3)
R218	8937(50K)
R219	200(100K)
R220	201(6200)
R301	201(100K)
R302	201(100)
R303	200(47)
R304	201(470K)
R305	201(470K)
R306	201(100K)
R307	201(680)
R308	200(47)
R309	201(150K)
R310	200(82K)
R311	201(22K)
R312	200(82K)
R313	200(680)
R314	201(100K)
R315	201(27K)
R316	201(100K)
R319	201(470)
R320	201(100K)
R321	201(15K)
R322	201(470K)
R323	201(470)
R324	201(100K)
R325	201(15K)
R326	8964-0102
R327	201(33K)
R328	201(15K)
R329	201(220K)
R330	201(27K)
R331	201(1MEG)
R332	201(1MEG)
R333	201(22K)
R334	201(2.2MEG)
R335	201(470K)
R336	201(470K)
R337	201(82K)
R338	204(10)
R339	201(3300)
R340	201(1500)
R341	200(33K)
R342	200(220)
R343	200(220)
R344	202(270)
R345	201(470K)
R346	200(1MEG)
R347	201(1MEG)
R348	201(680K)
R349	201(2MEG)
R350	201(1.5MEG)

Reference Designation	ARC Part No.
R351	200(1.5MEG)
R352	201(47K)
R353	201(10K)
R354	201(470K)
R355	201(100K)
R356	201(1.5MEG)
R358	201(1MEG)
R359	201(1MEG)
R360	201(1MEG)
R361	201(470K)
R362	201(470)
R401	201(27K)
R402	201(100K)
R403	201(100K)
R404	201(220K)
R405	201(47K)
R406	201(100K)
R407	201(2200)
R408	201(47K)
R409	201(2200)
R410	201(100K)
R411	201(1MEG)
R412	8915(100K)
R413	201(47K)
R414	201(1600)
R415	201(47K)
R416	201(100K)
R417	201(1000)
R418	8826
R419	200(330K)
T201	19345
T301	19968
T302	19968
T303	19968
T304	21248
T305	20679
V101	700-136
V102	700-136
V103	700-122
V104	700-129
V105	700-121
V106	700-143
V301	700-122
V302	700-122
V303	700-132
V304	700-132
V305	700-132
V306	700-132
V307	700-129
V308	700-131
V309	700-136
V310	700-133
V311	700-139
V401	700-143
V402	700-103
V403	700-136
V404	700-136
W201	20811
W202	24543
W301	20301
XV105	15230
XV106	19611
XV402	20362
Y101	19658-5302
Y102	19658-5402
Y103	19658-5502
Y104	19658-5602
Y105	19658-5702
Y106	19658-5802
Y107	19658-5902
Y108	19658-6002

Reference Designation	ARC Part No.
Y109	19658-6102
Y110	19658-6202
Y111	19658-6252
Y112	19658-6152
Y113	19658-6052
Y114	19658-5952
Y115	19658-5852
Y116	19658-5752
Y117	19658-5652
Y118	19658-5552
Y119	19658-5452
Y120	19658-5352
Y121	19657-9950
Y122	19657-1005
Y123	19657-1015
Y124	19657-1025
Y125	19657-1035
Y126	19657-1045
Y127	19657-1055
Y128	19657-1065
Y129	19657-1075
Y130	19657-1085
Y131	19657-1090
Y132	19657-1080
Y133	19657-1070
Y134	19657-1060
Y135	19657-1050
Y136	19657-1040
Y137	19657-1030
Y138	19657-1020
Y139	19657-1010
Y140	19657-1000
Y301	19658-5217
Y302	19658-5317
Y303	19658-5417
Y304	19658-5517
Y305	19658-5617
Y306	19658-5717
Y307	19658-5817
Y308	19658-5917
Y309	19658-6017
Y310	19658-6117
Y311	19658-6167
Y312	19658-6067
Y313	19658-5967
Y314	19658-5867
Y315	19658-5767
Y316	19658-5667
Y317	19658-5567
Y318	19658-5467
Y319	19658-5367
Y320	19658-5267
Z101	20806



CRYSTAL NO.	SYMBOL NO.	FREQUENCY MC
1	Y301	52.175
2	Y302	53.175
3	Y303	54.175
4	Y304	55.175
5	Y305	56.175
6	Y306	57.175
7	Y307	58.175
8	Y308	59.175
9	Y309	60.175
10	Y310	61.175
11	Y311	61.675
12	Y312	60.675
13	Y313	59.675
14	Y314	58.675
15	Y315	57.675
16	Y316	56.675
17	Y317	55.675
18	Y318	54.675
19	Y319	53.675
20	Y320	52.675

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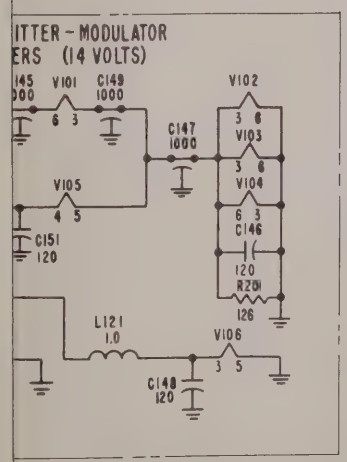
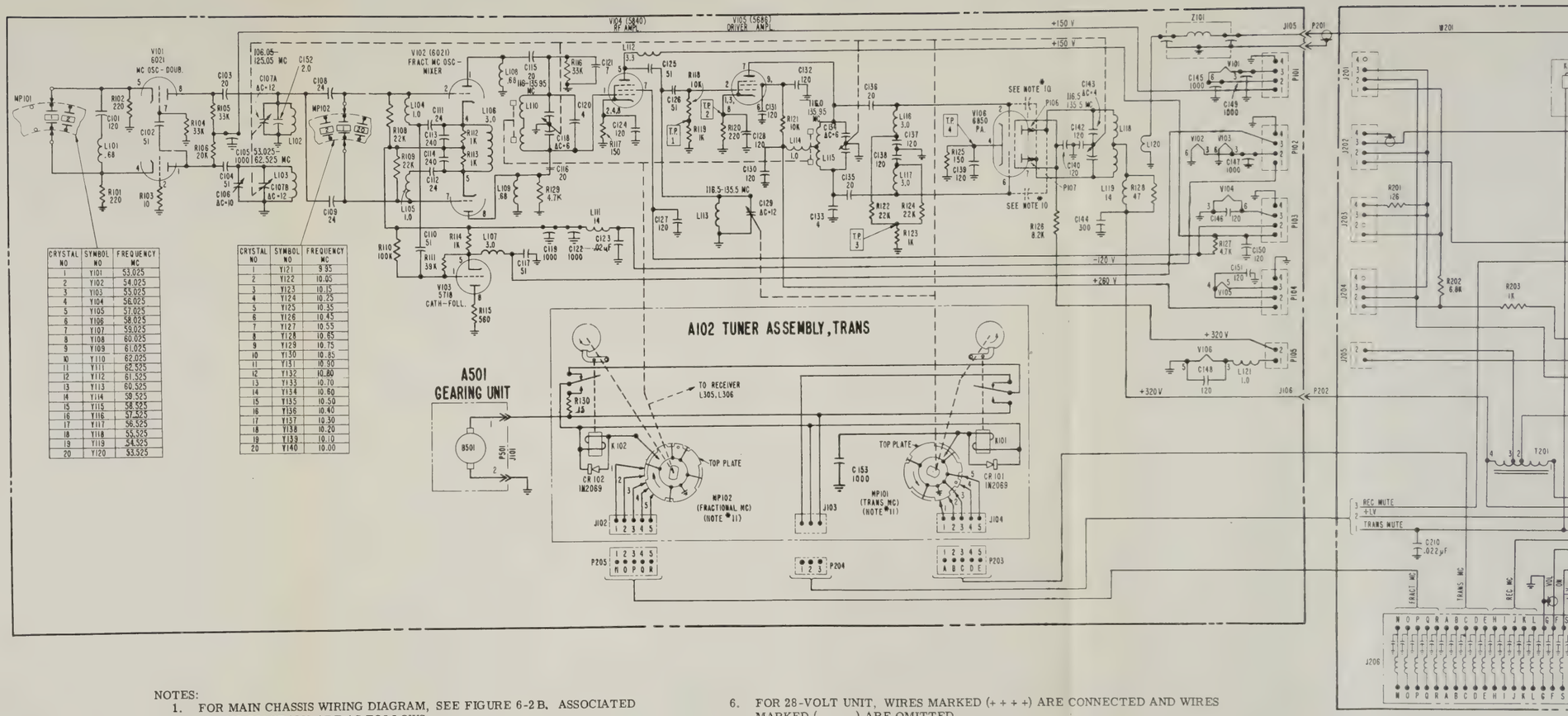


Figure 6-1C. ARC Type RT-11D Receiver-Transmitter, Schematic Diagram

A101 TRANSMITTER ASSEMBLY

TABLE 1.

DIAL →	MP301 J206	MP101 J206	DIAL →	MP102 J206
↓	H, I, J, K, L	A, B, C, D, E	↓	N, O, P, Q, R
116	K, L	B, C	.00	N, O
117	J, K, L	A, B, E	.10	N, R
118	H, L	C, D	.20	Q
119	I, J, K, L	A, D	.30	P
120	I	D, E	.40	O
121	H, I, J, K	C, E	.50	N
122	J	E	.60	R
123	H, I, J, L	B, D	.70	Q, R
124	K	A	.80	P, Q
125	H, I, K	A, C, E	.90	O, P
126	L	B	.95	N, O, R
127	H, J, L	B, D, E	.85	N, Q
128	H	C	.75	P, R
129	I, K	A, C, D, E	.65	O, Q
130	H, I	D	.55	N, P, R
131	H, J	B, C, D, E	.45	O, Q, R
132	I, J	A, E	.35	N, P, Q, R
133	I, L	A, B, C, D	.25	O, P, Q, R
134	J, K	A, B	.15	N, O, P, Q
135	H, K, L	A, B, C	.05	N, O, P



CRYSTAL NO	SYMBOL NO	FREQUENCY MC
1	Y101	53.025
2	Y102	54.025
3	Y103	55.025
4	Y104	56.025
5	Y105	57.025
6	Y106	58.025
7	Y107	59.025
8	Y108	60.025
9	Y109	61.025
10	Y110	62.025
11	Y111	62.525
12	Y112	61.525
13	Y113	60.525
14	Y114	59.525
15	Y115	58.525
16	Y116	57.525
17	Y117	56.525
18	Y118	55.525
19	Y119	54.525
20	Y120	53.525

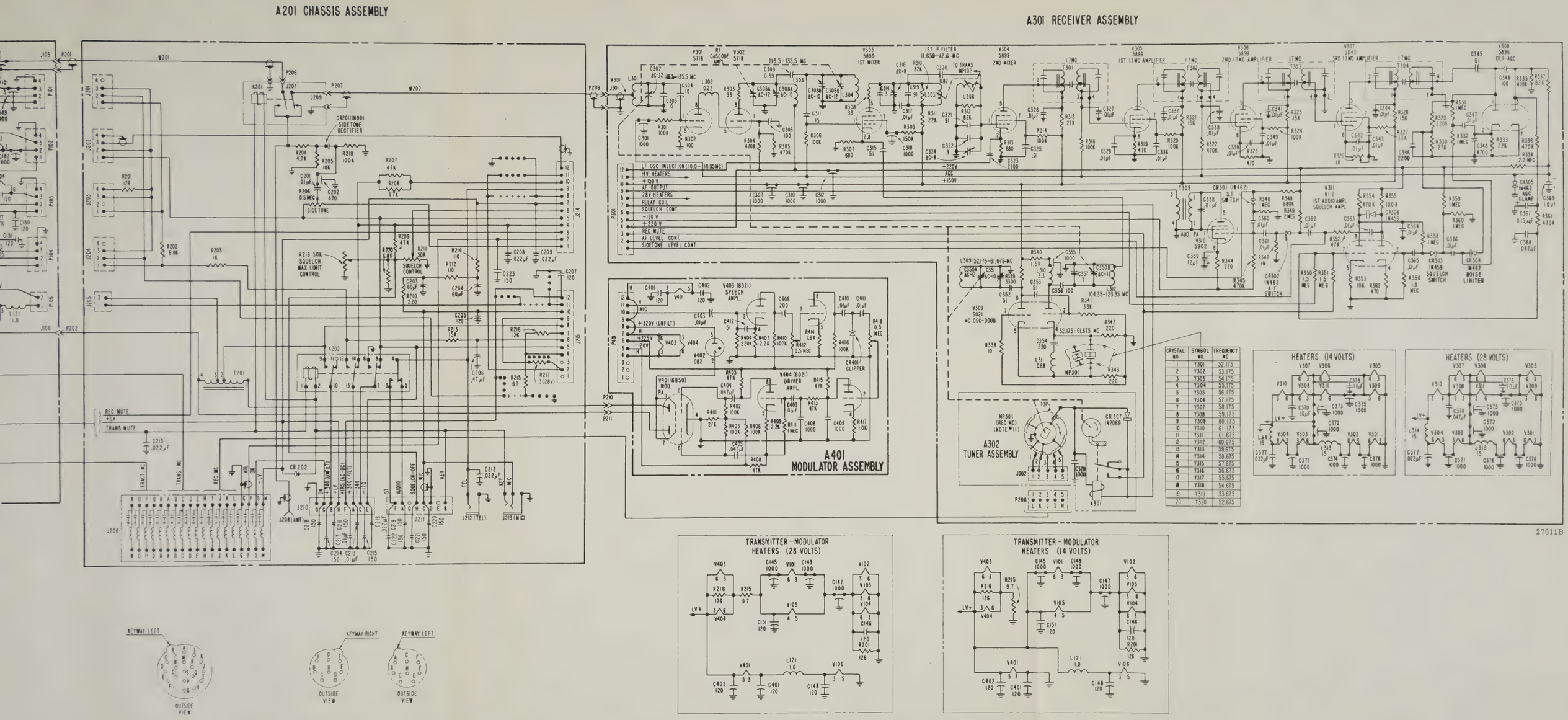
CRYSTAL NO	SYMBOL NO	FREQUENCY MC
1	Y121	9.95
2	Y122	10.05
3	Y123	10.15
4	Y124	10.25
5	Y125	10.35
6	Y126	10.45
7	Y127	10.55
8	Y128	10.65
9	Y129	10.75
10	Y130	10.85
11	Y131	10.90
12	Y132	10.80
13	Y133	10.70
14	Y134	10.60
15	Y135	10.50
16	Y136	10.40
17	Y137	10.30
18	Y138	10.20
19	Y139	10.10
20	Y140	10.00

NOTES:

1. FOR MAIN CHASSIS WIRING DIAGRAM, SEE FIGURE 6-2B. ASSOCIATED WIRING DIAGRAMS ARE AS FOLLOWS:

SYMBOL NO.	ASSEMBLY	FIGURE NO.
A101	TRANSMITTER	6-12 AND 6-12B
A301	RECEIVER	6-3 AND 6-3B
A401	MODULATOR	6-17

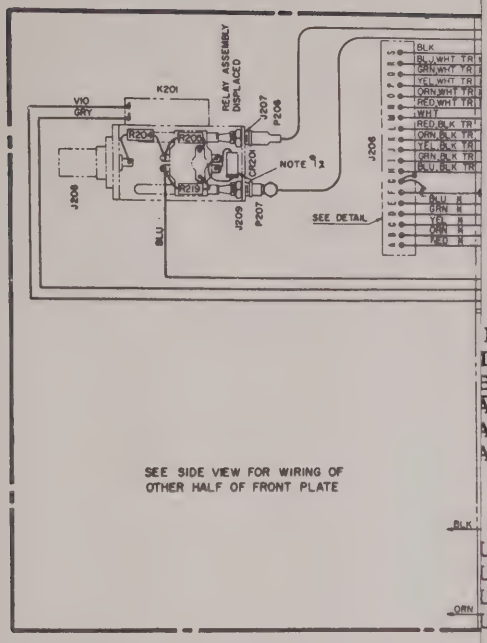
2. CAPACITANCE VALUES ARE IN MICROMICROFARADS ($\mu\mu$F) UNLESS OTHERWISE NOTED.
3. RESISTANCE VALUES ARE IN OHMS. MULTIPLIERS: K=1000; MEG=1,000,000.
4. INDUCTANCE VALUES ARE IN MICROHENRIES (μH), UNLESS OTHERWISE NOTED.
5. FOR 14-VOLT UNIT, WIRES MARKED (. . . .) ARE CONNECTED AND WIRES MARKED (+ + + +) ARE OMITTED.
6. FOR 28-VOLT UNIT, WIRES MARKED (+ + + +) ARE CONNECTED AND WIRES MARKED (. . . .) ARE OMITTED.
7. RELAYS ARE SHOWN IN UNENERGIZED POSITIONS.
8. CONNECTIONS ARE SHOWN TO WIRED SIDE OF RECEPTACLES.
9. CAPACITORS SHOWN ----|(---- ARE NEUTRALIZING CAPACITANCE OBTAINED BY PLACEMENT OF PARTS.
10. CRYSTAL DRUMS MP101, MP102, AND MP301 ARE SHOWN IN THE 123-MC, .00-MC, AND 127-MC POSITIONS, RESPECTIVELY (TOP VIEW). FOR POSITION-CONTROL CIRCUITING, SEE TABLE 1.
11. TABLE 1 SHOWS GROUNDED TERMINALS OF J206 VS CRYSTAL DRUM POSITIONS. UNTABULATED TERMINALS OF INDICATED GROUPS ARE CONNECTED TOGETHER AND TO ASSOCIATED RELAYS.



CRYSTAL NO	SYMBOL NO.	FREQUENCY MC
1	Y301	52.175
2	Y302	53.175
3	Y303	54.175
4	Y304	55.175
5	Y305	56.175
6	Y306	57.175
7	Y307	58.175
8	Y308	59.175
9	Y309	60.175
10	Y310	61.175
11	Y311	61.675
12	Y312	60.675
13	Y313	59.675
14	Y314	58.675
15	Y315	57.675
16	Y316	56.675
17	Y317	55.675
18	Y318	54.675
19	Y319	53.675
20	Y320	52.675

SIMPLIFIED SCHEMATICS OF TRANSMITTER-MODULATOR HEATER CONNECTIONS

Figure 6-1C. ARC Type RT-11D Receiver-Transmitter, Schematic Diagram

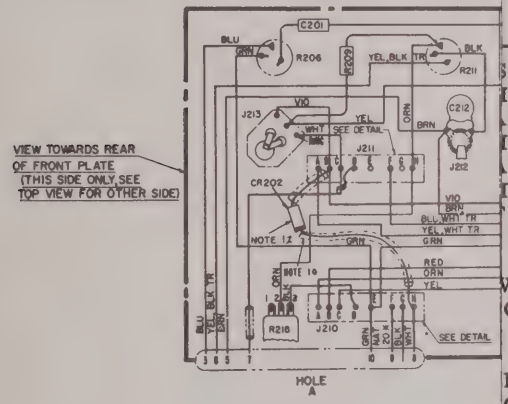


DIAGRAM, SEE FIGURE 6-1C.

ING DIAGRAMS OF MAJOR ASSEMBLIES ARE AS FOLLOWS:

BOL NO.	ASSEMBLY	FIGURE NO.
A101	TRANSMITTER	6-12 AND 6-12B
A301	RECEIVER	6-3 AND 6-3B
A401	MODULATOR	6-17

	DESCRIPTION
	#24 SOLID COPPER, TEFLON INSULATION
US (*)	#24 STRANDED COPPER, TEFLON INSULATION
US (22*)	#22 SOLID COPPER, TEFLON INSULATION
US (20*)	#20 STRANDED COPPER, TEFLON INSULATION
US (18*)	#18 STRANDED COPPER, VINYL INSULATION
	#22 SOLID, BARE, TINNED COPPER EXCEPT THOSE MARKED WITH SIZE AS SHOWN



—ARE #29 SOLID COPPERWELD MINIATURE TEFLON

IT, WIRES MARKED(+ + + +)ARE CONNECTED AND WIRES
RE OMITTED.

IT, WIRES MARKED(. . . .)ARE CONNECTED AND WIRES
RE OMITTED.

INYLITE TUBING OF APPROPRIATE SIZE IS INSTALLED
WIRES MARKED "T."
FOR CLARITY, PARTS ARE IDENTIFIED IN MORE THAN ONE

WIRING, SEE ALL VIEWS.
OF APPROPRIATE SIZE IS INSTALLED AS INDICATED.
INDICATED (—► ◄—) ARE BOUND WITH WAXED NYLON

ND OF CRYSTAL DIODES INDICATES END NEAREST COLOR
OLDER ALL CRYSTAL DIODES USING A "HEAT SINK" SUCH
EEN SOLDERING POINT AND CRYSTAL BODY.

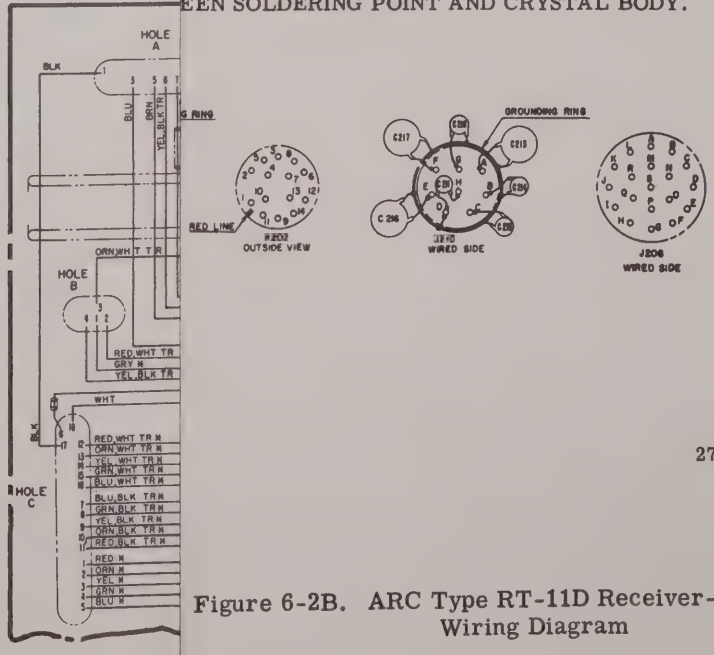


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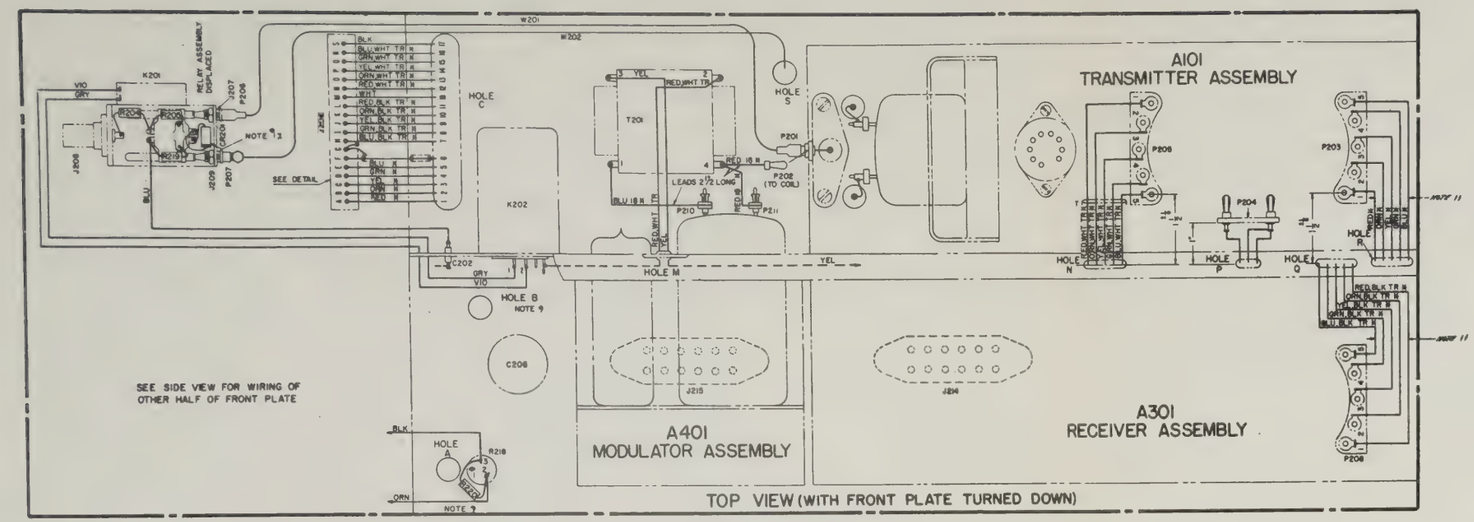
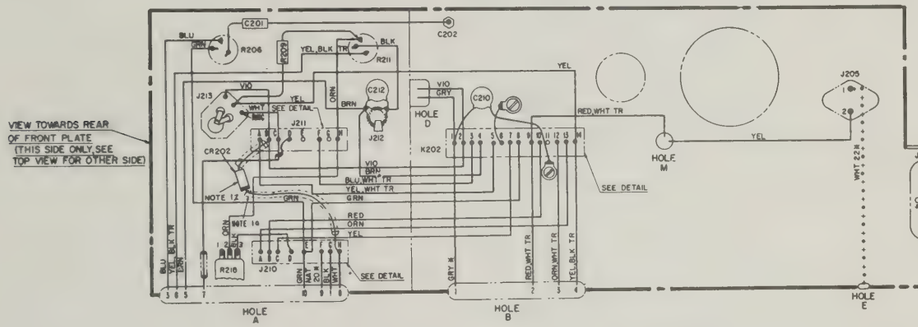
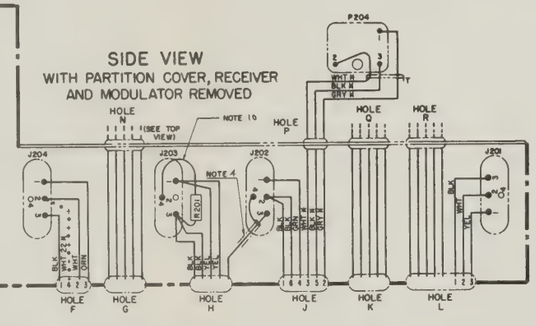
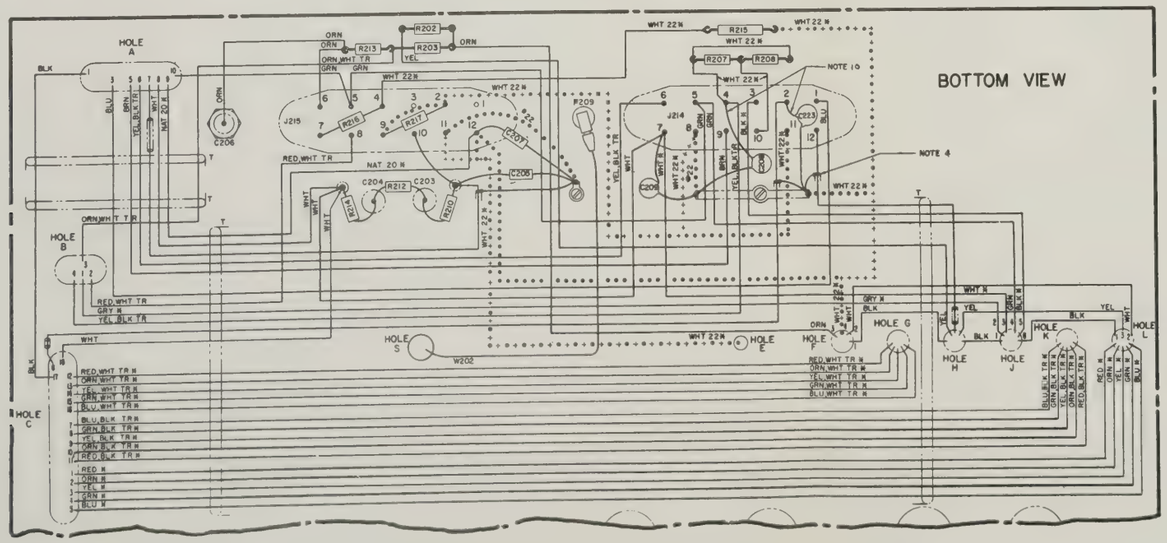
Figure 6-2B. ARC Type RT-11D Receiver-Transmitter, Wiring Diagram









NOTES:

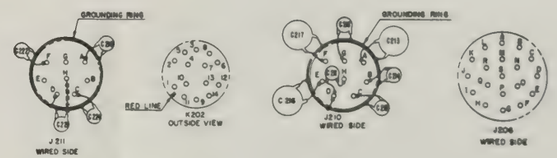
1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6-1C.
2. ASSOCIATED WIRING DIAGRAMS OF MAJOR ASSEMBLIES ARE AS FOLLOWS:

SYMBOL NO.	ASSEMBLY	FIGURE NO.
A101	TRANSMITTER	6-12 AND 6-12B
A301	RECEIVER	6-3 AND 6-3B
A401	MODULATOR	6-17

3. WIRES:

MARKING	DESCRIPTION
COLOR NOTE	#24 SOLID COPPER, TEFLON INSULATION
COLOR NOTE PLUS (*)	#24 STRANDED COPPER, TEFLON INSULATION
COLOR NOTE PLUS (22*)	#22 SOLID COPPER, TEFLON INSULATION
COLOR NOTE PLUS (20*)	#20 STRANDED COPPER, TEFLON INSULATION
COLOR NOTE PLUS (18*)	#18 STRANDED COPPER, VINYL INSULATION
UNMARKED	#22 SOLID, BARE, TINNED COPPER EXCEPT THOSE MARKED WITH SIZE AS SHOWN

4. WIRES MARKED —⊐— ARE #29 SOLID COPPERWELD MINIATURE TEFLON COAXIAL CABLES.
5. FOR 28-VOLT UNIT, WIRES MARKED(+ + + +)ARE CONNECTED AND WIRES MARKED(. . . .)ARE OMITTED.
6. FOR 14-VOLT UNIT, WIRES MARKED(. . . .)ARE CONNECTED AND WIRES MARKED(+ + + +)ARE OMITTED.
7. TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE IS INSTALLED OVER GROUPS OF WIRES MARKED "T."
8. WHEN REQUIRED FOR CLARITY, PARTS ARE IDENTIFIED IN MORE THAN ONE VIEW.
9. FOR COMPLETE WIRING, SEE ALL VIEWS.
10. TEFLON TUBING OF APPROPRIATE SIZE IS INSTALLED AS INDICATED.
11. WIRES OF GROUP INDICATED (—► ◄—) ARE BOUND WITH WAXED NYLON LACING TAPE.
12. DARK BAND ON END OF CRYSTAL DIODES INDICATES END NEAREST COLOR CODING BAND. SOLDER ALL CRYSTAL DIODES USING A "HEAT SINK" SUCH AS PLIERS BETWEEN SOLDERING POINT AND CRYSTAL BODY.



27612B

Figure 6-2B. ARC Type RT-11D Receiver-Transmitter, Wiring Diagram

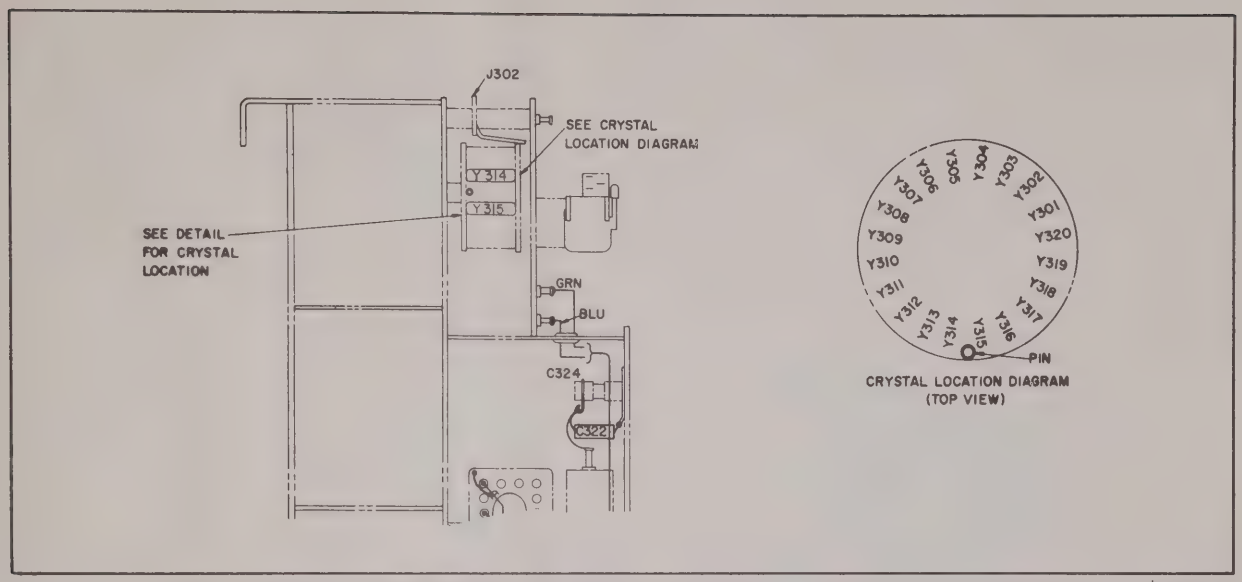


Figure 6-3B. Modification of Figure 6-3 for RT-11D Receiver-Transmitter P/O27721B

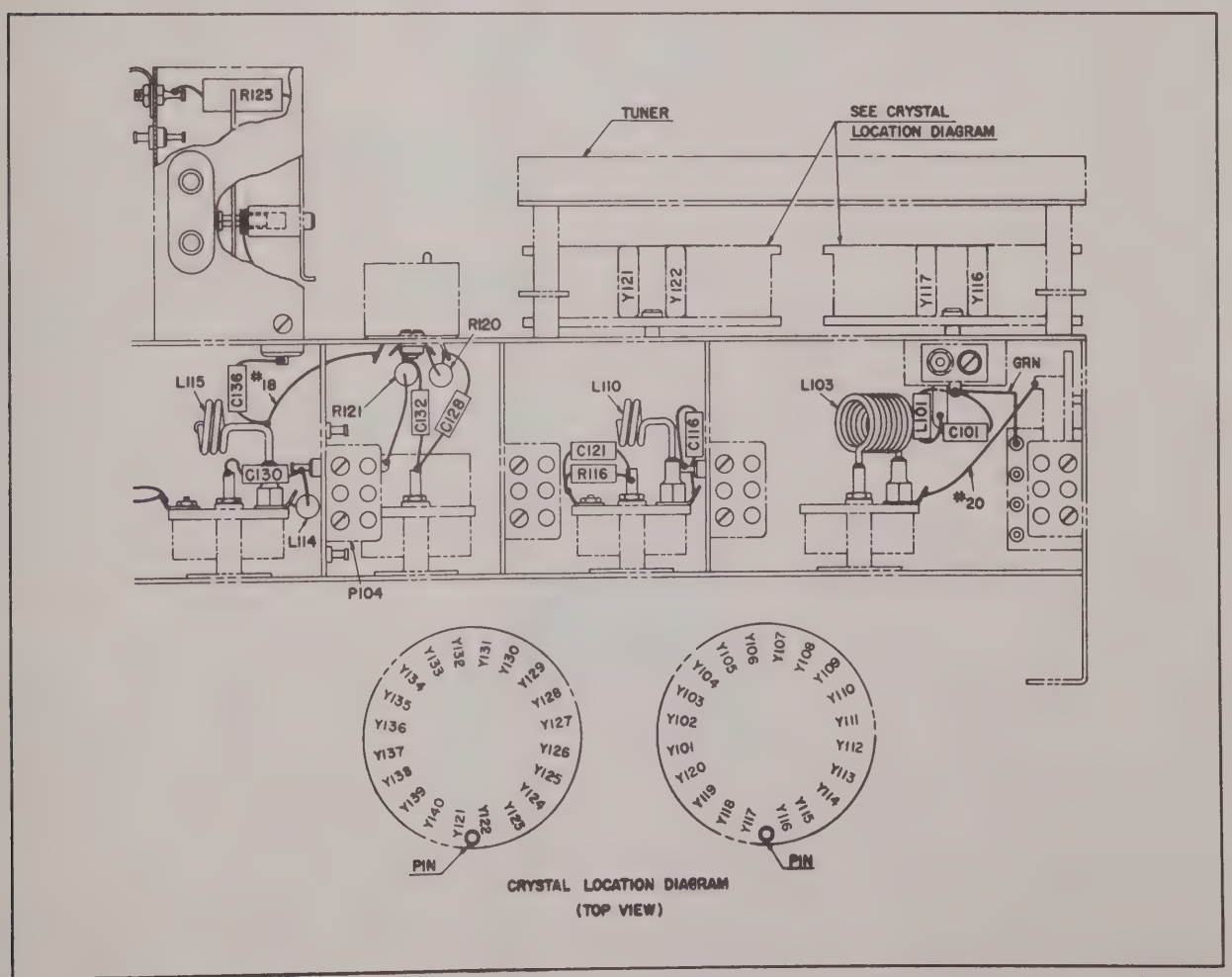


Figure 6-12B. Modification of Figure 6-12 for RT-11D Receiver-Transmitter P/O27731A

TABLE 1. TABULATION OF GROUNDED TERMIN
IN EACH GROUP (NOTE 6)

S603A	GROUP H, I, J, K, L	GROUP A, B, C, D, E S601 → SCS	GROUP A, B, C, D, E S601 → DCS	S603B	N,
116	K, L	B, C	E	.00	
117	J, K, L	A, B, E	B, D	.05	
118	H, L	C, D	A	.10	
119	I, J, K, L	A, D	A, C, E	.15	
120	I	D, E	B	.20	
121	H, I, J, K	C, E	B, D, E	.25	
122	J	E	C	.30	
123	H, I, J, L	B, D	A, C, D, E	.35	
124	K	A	D	.40	
125	H, I, K	A, C, E	B, C, D, E	.45	
126	L	B	A, E	.50	
127	H, J, L	B, D, E	A, B, C, D	.55	
128	H	C	A, B	.60	
129	I, K	A, C, D, E	A, B, C	.65	
130	H, I	D	B, C	.70	
131	H, J	B, C, D, E	A, B, E	.75	
132	I, J	A, E	C, D	.80	
133	I, L	A, B, C, D	A, D	.85	
134	J, K	A, B	D, E	.90	
135	H, K, L	A, B, C	C, E	.95	

NOTES:

1. FOR WIRING DIAGRAM, SEE FIGURE 6-20B.
2. SWITCH SECTIONS S601A, S601B, AND S601C A
IN SCS POSITION.
3. SWITCH SECTIONS S603A AND S603B ARE SHOW
MC POSITION. FOR IDENTIFICATION OF SWIT
NALS, SEE FIGURE 6-20B.
4. SWITCH TERMINALS ON S601 AND S602 ARE VI
FROM KNOB END OF SWITCH IN ALL SECTION
5. SHADED AREAS ON SWITCH SECTIONS S603A A
INDICATE PLATED SURFACE. DOUBLE CROSS
AREAS ARE GROUNDED.
6. S603A CONTROLS TERMINAL GROUPS A, B, C, D
I, J, K, L OF J601; S603B CONTROLS GROUP N, C
AT EACH POSITION OF S603A AND S603B, CER
TERMINALS IN EACH GROUP ARE GROUNDED
OTHER TERMINALS OF THE GROUP ARE CONN
TOGETHER, FREE OF GROUND. SEE TABLE
7. FOR CONTINUITY SEQUENCE TABLE FOR S603
S603B, SEE FIGURE 6-21B.

PARTS LIST

Ref Desig	Description	ARC Part
DS601	Lamp	8622
DS602	Lamp	8622
J601	Receptacle	12350
R601	0—250, 000 ohms	8862
S601A, B, C	Switch	24978
S602A, B	Switch	24977
S603A	Panel assy (10 contacts)	20358
S603B	Panel assy (10 contacts)	21689
S604	Switch	Part of 88
XD60S1	Panel light	16293
XD60S2	Panel light	16293

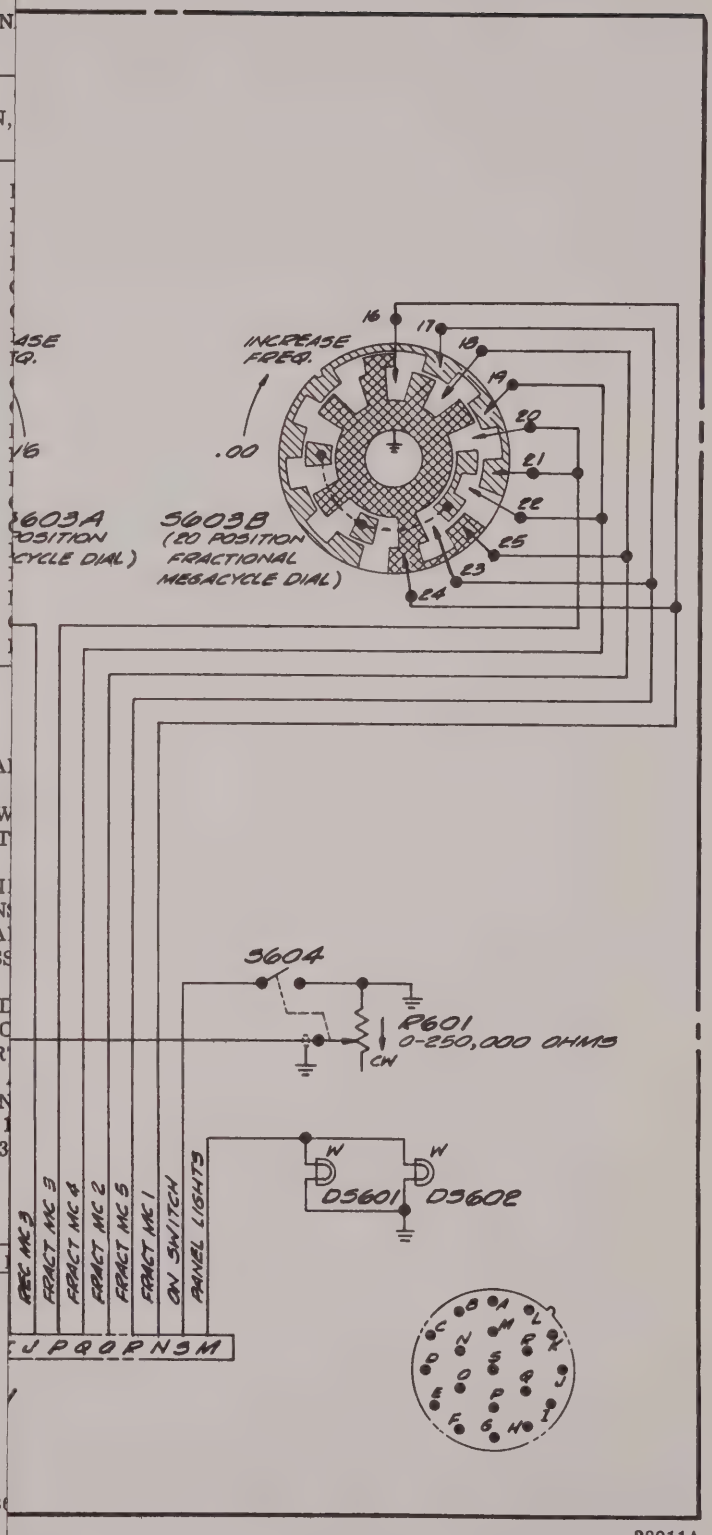


Figure 6-19B. ARC Type C-67D Control Unit, Schematic Diagram

TABLE 1. TABULATION OF GROUNDED TERMINALS IN EACH GROUP (NOTE 6)

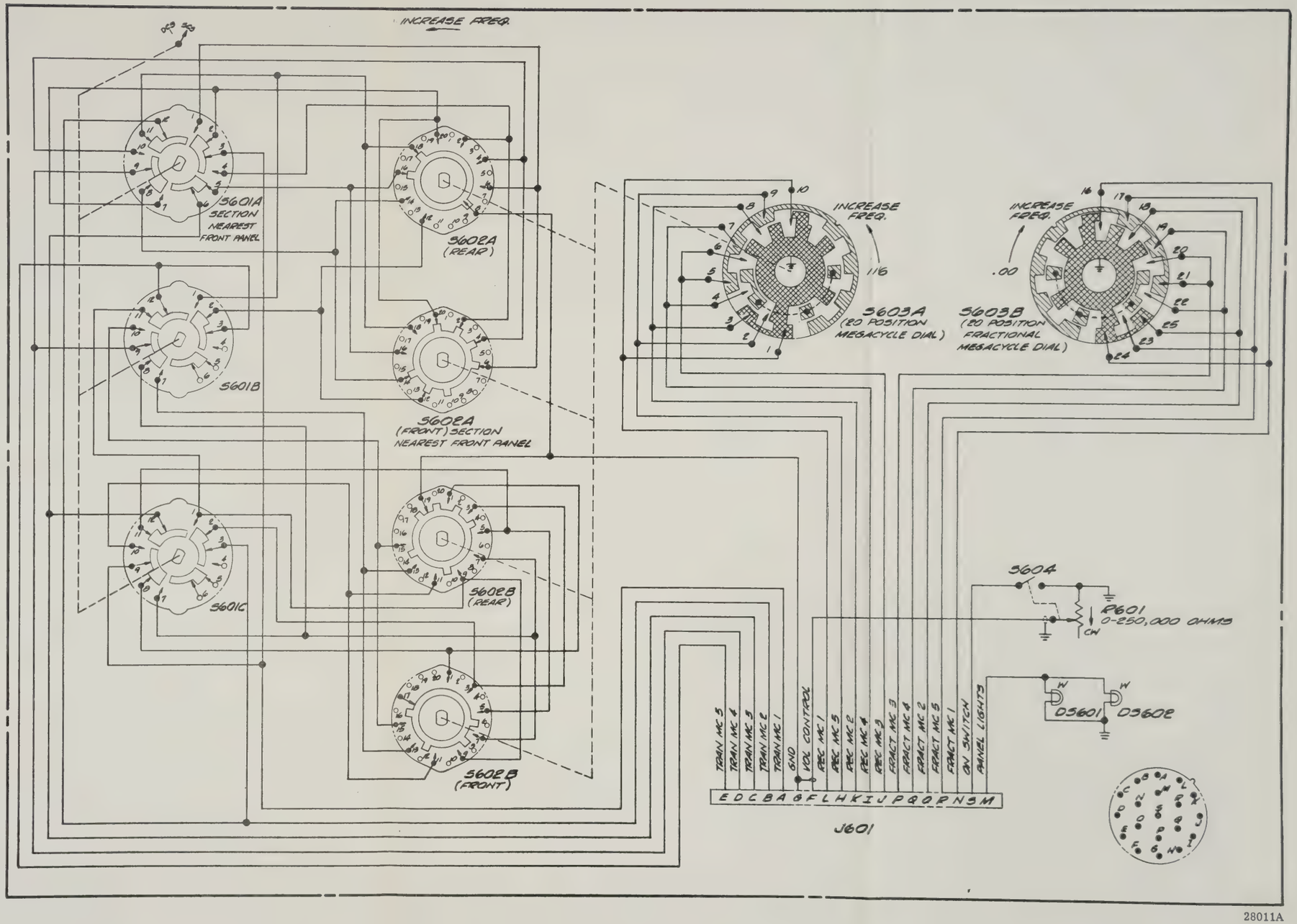
S603A	GROUP H, I, J, K, L	GROUP A, B, C, D, E S601 → SCS	GROUP A, B, C, D, E S601 → DCS	S603B	GROUP N, O, P, Q, R
116	K, L	B, C	E	.00	N, O
117	J, K, L	A, B, E	B, D	.05	N, O, P
118	H, L	C, D	A	.10	N, R
119	I, J, K, L	A, D	A, C, E	.15	N, O, P, Q
120	I	D, E	B	.20	Q
121	H, I, J, K	C, E	B, D, E	.25	O, P, Q, R
122	J	E	C	.30	P
123	H, I, J, L	B, D	A, C, D, E	.35	N, P, Q, R
124	K	A	D	.40	O
125	H, I, K	A, C, E	B, C, D, E	.45	O, Q, R
126	L	B	A, E	.50	N
127	H, J, L	B, D, E	A, B, C, D	.55	N, P, R
128	H	C	A, B	.60	R
129	I, K	A, C, D, E	A, B, C	.65	O, Q
130	H, I	D	B, C	.70	Q, R
131	H, J	B, C, D, E	A, B, E	.75	P, R
132	I, J	A, E	C, D	.80	P, Q
133	I, L	A, B, C, D	A, D	.85	N, Q
134	J, K	A, B	D, E	.90	O, P
135	H, K, L	A, B, C	C, E	.95	N, O, R

NOTES:

1. FOR WIRING DIAGRAM, SEE FIGURE 6-20B.
2. SWITCH SECTIONS S601A, S601B, AND S601C ARE SHOWN IN SCS POSITION.
3. SWITCH SECTIONS S603A AND S603B ARE SHOWN IN 116.00-MC POSITION. FOR IDENTIFICATION OF SWITCH TERMINALS, SEE FIGURE 6-20B.
4. SWITCH TERMINALS ON S601 AND S602 ARE VIEWED FROM KNOB END OF SWITCH IN ALL SECTIONS.
5. SHADED AREAS ON SWITCH SECTIONS S603A AND S603B INDICATE PLATED SURFACE. DOUBLE CROSS-HATCHED AREAS ARE GROUNDED.
6. S603A CONTROLS TERMINAL GROUPS A, B, C, D, E AND H, I, J, K, L OF J601; S603B CONTROLS GROUP N, O, P, Q, R. AT EACH POSITION OF S603A AND S603B, CERTAIN TERMINALS IN EACH GROUP ARE GROUNDED AND THE OTHER TERMINALS OF THE GROUP ARE CONNECTED TOGETHER, FREE OF GROUND. SEE TABLE 1.
7. FOR CONTINUITY SEQUENCE TABLE FOR S603A AND S603B, SEE FIGURE 6-21B.

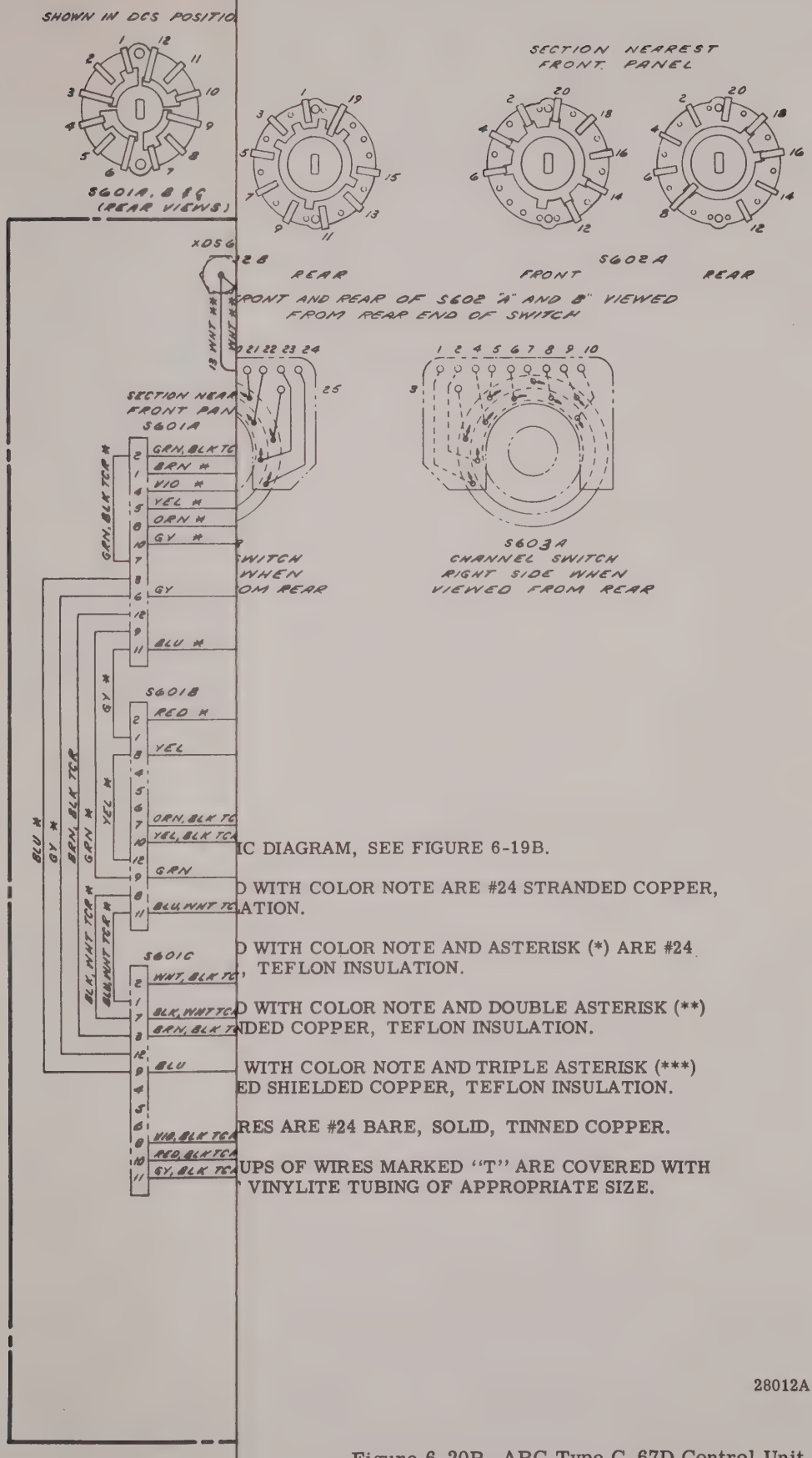
PARTS LIST

Ref Desig	Description	ARC Part No.
DS601	Lamp	8622
DS602	Lamp	8622
J601	Receptacle	12350
R601	0—250,000 ohms	8862
S601A, B, C	Switch	24978
S602A, B	Switch	24977
S603A	Panel assy (10 contacts)	20358
S603B	Panel assy (10 contacts)	21689
S604	Switch	Part of 8862
XD60S1	Panel light	16293
XD60S2	Panel light	16293



28011A

Figure 6-19B. ARC Type C-67D Control Unit, Schematic Diagram



IC DIAGRAM, SEE FIGURE 6-19B.

D WITH COLOR NOTE ARE #24 STRANDED COPPER,
ATION.

D WITH COLOR NOTE AND ASTERISK (*) ARE #24
, TEFLON INSULATION.

D WITH COLOR NOTE AND DOUBLE ASTERISK (**)
NDED COPPER, TEFLON INSULATION.

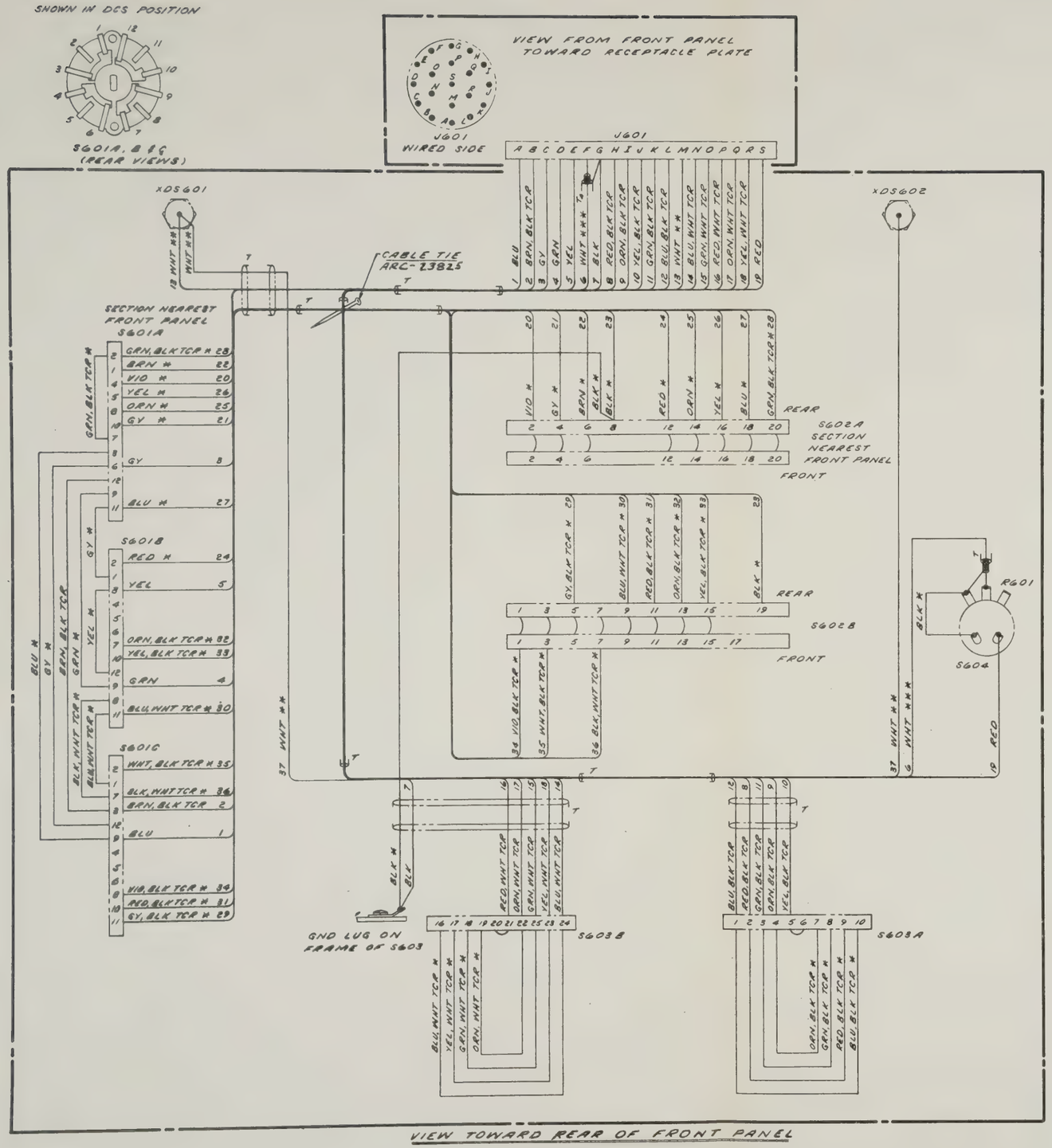
WITH COLOR NOTE AND TRIPLE ASTERISK (***)
ED SHIELDED COPPER, TEFLON INSULATION.

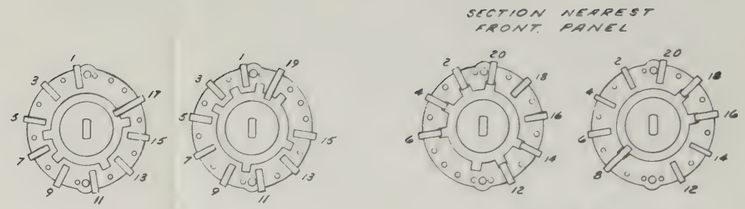
RES ARE #24 BARE, SOLID, TINNED COPPER.

UPS OF WIRES MARKED "T" ARE COVERED WITH
VINYLITE TUBING OF APPROPRIATE SIZE.

28012A

Figure 6-20B. ARC Type C-67D Control Unit, Wiring Diagram





NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6-19B.
2. WIRES MARKED WITH COLOR NOTE ARE #24 STRANDED COPPER, TEFLON INSULATION.
3. WIRES MARKED WITH COLOR NOTE AND ASTERISK (*) ARE #24 SOLID COPPER, TEFLON INSULATION.
4. WIRES MARKED WITH COLOR NOTE AND DOUBLE ASTERISK (**) ARE #22 STRANDED COPPER, TEFLON INSULATION.
5. WIRE MARKED WITH COLOR NOTE AND TRIPLE ASTERISK (***) IS #22 STRANDED SHIELDED COPPER, TEFLON INSULATION.
6. UNMARKED WIRES ARE #24 BARE, SOLID, TINNED COPPER.
7. WIRES OR GROUPS OF WIRES MARKED "T" ARE COVERED WITH TRANSPARENT VINYLITE TUBING OF APPROPRIATE SIZE.

28012A

Figure 6-20B. ARC Type C-67D Control Unit, Wiring Diagram

NOTES:

1. TRANSMITTER MC CYC
TO SCS OPERATION; SY
RECEIVER MC CYCLIN
OPERATION.

2. TO CHECK CONTINUITY
POSITIONS LISTED IN T
MODEL 260, OR EQUIV
R X 1 SCALE SO THAT
NECT ONE LEAD TO GR
THE OTHER LEAD TO E
CORRECT CONTINUITY
IS GIVEN BY THE FOLL
HAVING THE SAME SYM

(*) = GROUNDED
(†) = UNGROUND
OTHER TE

3. AFTER CHECKING THE
REMOVE THE TEST LE
OF THE TERMINALS MA
ALL OTHER TERMINAL
NECTED TOGETHER.
THE MEGACYCLE CHA
RECT CONTINUITY FOR

TERMINAL OF J601
A
B
C
D
E

4. USING THE TABLE, TH
CRYSTAL DRUM SWITC
6-1C), CAN BE CHECKE
RT-11D. THE WIRING
THE TABLE.

Cycling		Switch Position (MC)	Fractional MC Cycling J601 Terminal				
K	L		N	O	P	Q	R
*	*	.00	*	*	†	†	†
*	*	.05	*	*	*	†	†
†	*	.10	*	†	†	†	*
*	*	.15	*	*	*	*	†
†	†	.20	†	†	†	*	†
*	†	.25	†	*	*	*	*
†	†	.30	†	†	*	†	†
†	*	.35	*	†	*	*	*
*	†	.40	†	*	†	†	†
*	†	.45	†	*	†	*	*
†	*	.50	*	†	†	†	†
†	*	.55	*	†	*	†	*
†	†	.60	†	†	†	†	*
*	†	.65	†	*	†	*	†
†	†	.70	†	†	†	*	*
†	†	.75	†	†	*	†	*
†	†	.80	†	†	*	*	†
†	*	.85	*	†	†	*	†
*	†	.90	†	*	*	†	†
*	*	.95	*	*	†	†	*

TP3419

Figure 6-21B. Continuity Sequence Table for C-67D Channel Selector Switches S602A and S602B

NOTES:

1. TRANSMITTER MC CYCLING SYMBOLS WITHOUT PARENTHESES APPLY TO SCS OPERATION; SYMBOLS IN PARENTHESES, DCS OPERATION. RECEIVER MC CYCLING SYMBOLS APPLY TO EITHER SCS OR DCS OPERATION.

2. TO CHECK CONTINUITY OF ANY OF THE CHANNEL SELECTOR SWITCH POSITIONS LISTED IN THE TABLE, USE A VOLT-OHMMETER (SIMPSON MODEL 260, OR EQUIVALENT) AND SET THE RANGE SWITCH TO THE R X 1 SCALE SO THAT POSITIVE CONTACT MAY BE DETERMINED. CONNECT ONE LEAD TO GROUND, TERMINAL G OF J601, AND CONNECT THE OTHER LEAD TO EACH OF THE TERMINALS INDICATED. THE CORRECT CONTINUITY FOR THE SWITCH POSITION BEING CHECKED IS GIVEN BY THE FOLLOWING CODE, IN WHICH TERMINAL LEADS HAVING THE SAME SYMBOL ARE CONNECTED TO EACH OTHER.

   (*) = GROUNDED TERMINAL
   (†) = UNGROUNDED TERMINAL AND CONNECTED TO OTHER TERMINALS MARKED (†)

3. AFTER CHECKING THE CONTINUITY OF EACH TERMINAL TO GROUND, REMOVE THE TEST LEAD FROM GROUND AND CONNECT IT TO ONE OF THE TERMINALS MARKED (†). THEN CHECK CONTINUITY WITH ALL OTHER TERMINALS MARKED (†) TO INSURE THAT THEY ARE CONNECTED TOGETHER. FOR EXAMPLE: ASSUMING DCS OPERATION AND THE MEGACYCLE CHANNEL SELECTOR SWITCH SET AT 128 MC, CORRECT CONTINUITY FOR THIS SWITCH POSITION WOULD BE:

TERMINAL OF J601	CORRECT CONTINUITY
A	(*) = GROUNDED
B	(*) = GROUNDED
C	(†) = UNGROUNDED, CONNECTED TO TERMINALS D AND E
D	(†) = UNGROUNDED, CONNECTED TO TERMINALS C AND E
E	(†) = UNGROUNDED, CONNECTED TO TERMINALS C AND D

4. USING THE TABLE, THE CONTINUITY OF ANY POSITION OF THE RT-11D CRYSTAL DRUM SWITCHES, MP101, MP102, AND MP301 (SEE FIGURE 6-1C), CAN BE CHECKED BY TESTING THE TERMINALS OF J206 OF THE RT-11D. THE WIRING OF J206 IS IDENTICAL TO THAT OF J601 GIVEN IN THE TABLE.

Switch Position (MC)	Transmitter MC Cycling J601 Terminal A	B	C	D	E	Receiver MC Cycling J601 Terminal H	I	J	K	L	Switch Position (MC)	Fractional MC Cycling J601 Terminal N	O	P	Q	R
116	† (†)	* (†)	* (†)	† (†)	† (*)	†	†	†	*	*	.00	*	*	†	†	†
117	* (†)	* (*)	† (†)	† (*)	* (†)	†	†	*	*	*	.05	*	*	*	†	†
118	† (*)	† (†)	* (†)	* (†)	† (†)	*	†	†	†	*	.10	*	†	†	†	*
119	* (*)	† (†)	† (*)	* (†)	† (*)	†	*	*	*	*	.15	*	*	*	*	†
120	† (†)	† (*)	† (†)	* (†)	* (†)	†	*	†	†	†	.20	†	†	†	*	†
121	† (†)	† (*)	* (†)	† (*)	* (*)	*	*	*	*	†	.25	†	*	*	*	*
122	† (†)	† (†)	† (*)	† (†)	* (†)	†	†	*	†	†	.30	†	†	*	†	†
123	† (†)	* (†)	† (*)	* (*)	† (*)	*	*	*	†	*	.35	*	†	*	*	*
124	* (†)	† (†)	† (†)	† (*)	† (†)	†	†	†	*	†	.40	†	*	†	†	†
125	* (†)	† (*)	* (*)	† (*)	* (*)	*	*	†	*	†	.45	†	*	†	*	*
126	† (*)	* (†)	† (†)	† (†)	† (*)	†	†	†	†	*	.50	*	†	†	†	†
127	† (*)	* (*)	† (*)	* (*)	* (†)	*	†	*	†	*	.55	*	†	*	†	*
128	† (*)	† (*)	* (†)	† (†)	† (†)	*	†	†	†	†	.60	†	†	†	†	*
129	* (*)	† (*)	* (*)	* (†)	* (†)	†	*	†	*	†	.65	†	*	†	*	†
130	† (†)	† (*)	† (*)	* (†)	† (†)	*	*	†	†	†	.70	†	†	†	*	*
131	† (*)	* (*)	* (†)	* (†)	* (*)	*	†	*	†	†	.75	†	†	*	†	*
132	* (†)	† (†)	† (*)	† (*)	* (†)	†	*	*	†	†	.80	†	†	*	*	†
133	* (*)	* (†)	* (†)	* (*)	† (†)	†	*	†	†	*	.85	*	†	†	*	†
134	* (†)	* (†)	† (†)	† (*)	† (*)	†	†	*	*	†	.90	†	*	*	†	†
135	* (†)	* (†)	* (*)	† (†)	† (*)	*	†	†	*	*	.95	*	*	†	†	*

TP3419

Figure 6-21B. Continuity Sequence Table for C-67D Channel Selector Switches S602A and S602B

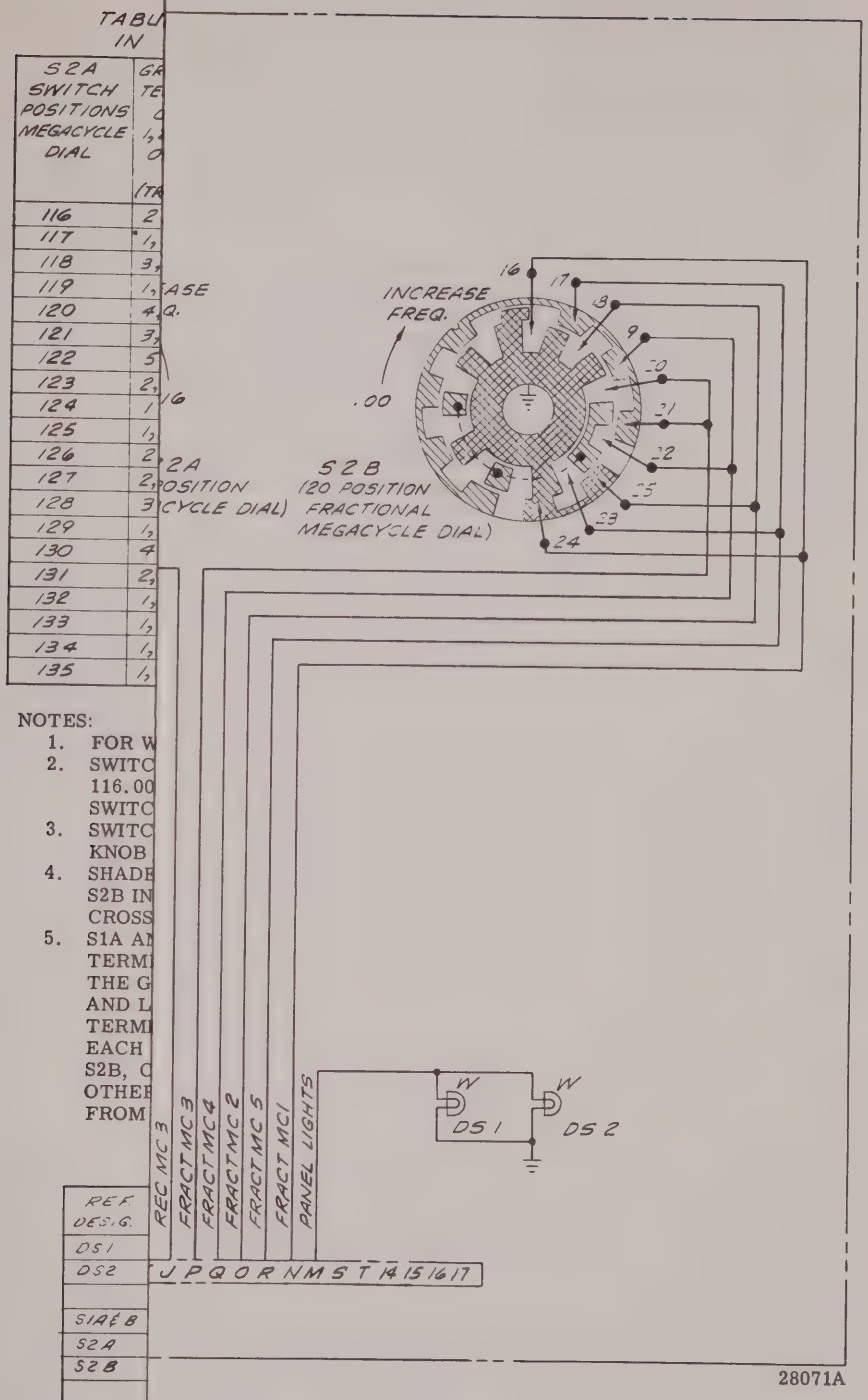


Figure 6-21C. ARC Type CC-10D Control Unit, Schematic Diagram

TABULATION OF GROUNDED TERMINALS IN EACH GROUP (SEE NOTE 5)

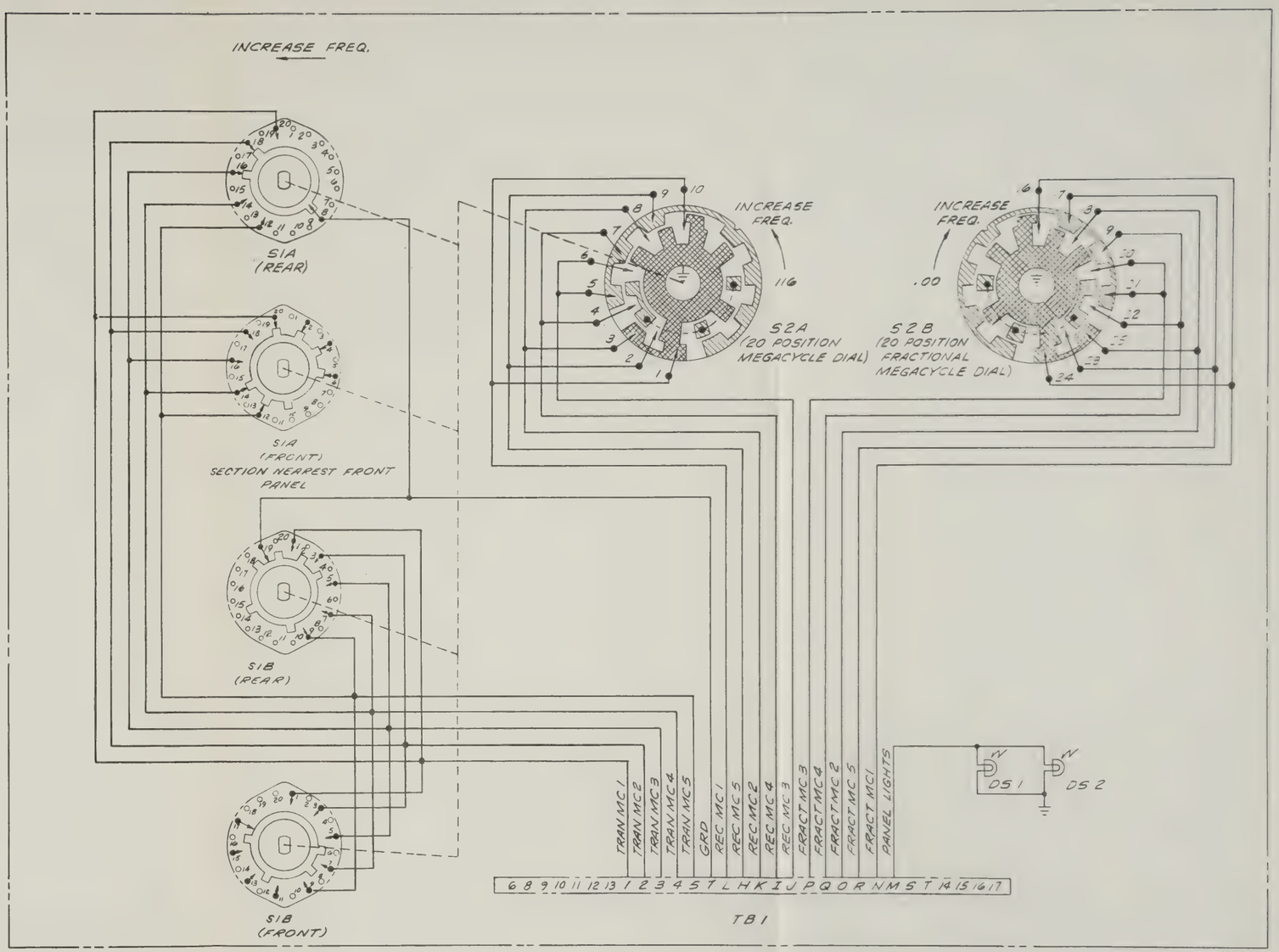
S2A SWITCH POSITIONS MEGACYCLE DIAL	GROUNDED TERMINALS GROUP 1,2,3,4,&5 OF TB1 (TRANS MC)	GROUNDED TERMINALS GROUP H,I,J,K,&L OF TB1 (REC. MC)	S2B SWITCH POSITIONS FRACTIONAL MEGACYCLE DIAL	GROUNDED TERMINALS GROUP N,O,P,Q,&R OF TB1
116	2, 3	K, L	.00	N, O
117	1, 2, 5	J, K, L	.05	N, O, P
118	3, 4	H, L	.10	N, R
119	1, 4	I, J, K, L	.15	N, O, P, Q
120	4, 5	I	.20	Q
121	3, 5	H, I, J, K	.25	O, P, Q, R
122	5	J	.30	P
123	2, 4	H, I, J, L	.35	N, P, Q, R
124	1	K	.40	O
125	1, 3, 5	H, I, K	.45	O, Q, R
126	2	L	.50	N
127	2, 4, 5	H, J, L	.55	N, P, R
128	3	H	.60	R
129	1, 3, 4, 5	I, K	.65	O, Q
130	4	H, I	.70	O, R
131	2, 3, 4, 5	H, J	.75	P, R
132	1, 5	I, J	.80	P, Q
133	1, 2, 3, 4	I, L	.85	N, Q
134	1, 2	J, K	.90	O, P
135	1, 2, 3	H, K, L	.95	N, O, R

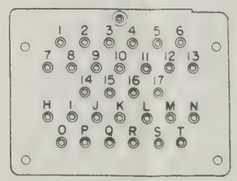
NOTES:

1. FOR WIRING DIAGRAM, SEE FIGURE 6-21D.
2. SWITCH SECTIONS S2A AND S2B ARE SHOWN IN 116.00-MC POSITION. FOR IDENTIFICATION OF SWITCH TERMINALS, SEE FIGURE 6-21D.
3. SWITCH TERMINALS ON S1 ARE VIEWED FROM KNOB END OF SWITCH IN ALL SECTIONS.
4. SHADED AREAS ON SWITCH SECTIONS S2A AND S2B INDICATE PLATED SURFACE. DOUBLE CROSS-HATCHED AREAS ARE GROUNDED.
5. S1A AND S1B CONTROL THE GROUNDING OF TERMINALS 1, 2, 3, 4, AND 5; S2A CONTROLS THE GROUNDING OF TERMINALS H, I, J, K, AND L; AND S2B CONTROLS THE GROUNDING OF TERMINALS N, O, P, Q, AND R OF TB1. AT EACH POSITION OF S1A AND S1B, AND S2A OR S2B, CERTAIN TERMINALS ARE GROUNDED AND OTHERS ARE CONNECTED TOGETHER, FREE FROM GROUND. SEE TABLE.

PARTS LIST

REF. DESIG.	DESCRIPTION	ARC PART NO.
DS1	LAMP	8622
DS2	LAMP	8622
S1A&B	SWITCH	24977
S2A	PANEL ASSEMBLY (10 CONTACTS)	21689
S2B	PANEL ASSEMBLY (10 CONTACTS)	20358
TB1	TERMINAL PLATE	23846
XDS1	LIGHT ASSEMBLY	23861
XDS2	LIGHT ASSEMBLY	23861



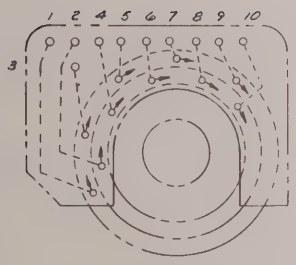


TB1
OUTSIDE VIEW

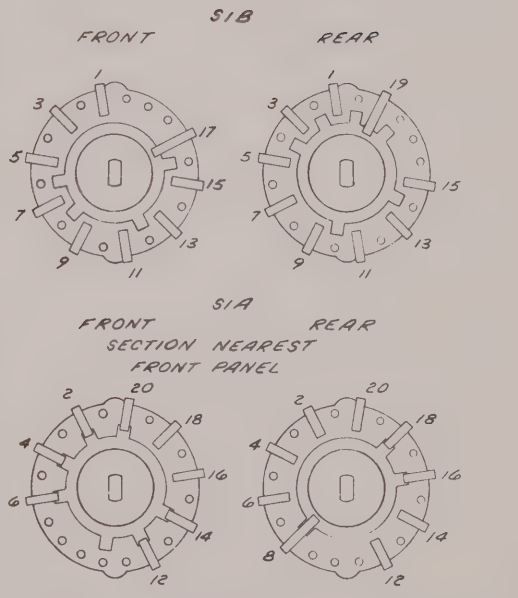
Figure 6-21C. ARC Type CC-10D Control Unit, Schematic Diagram

NOTES:

1. FOR SCHEMATIC DIAGRAM,
2. WIRES MARKED WITH COLOR
   PER, TEFLON INSULATED.
   ASTERISK (*) ARE NO. 24 AW
   WIRES MARKED WITH COLOR
   NO. 22 AWG STRANDED COP
   WIRES ARE NO. 24 AWG BAR
3. GROUPS OF WIRES MARKED
   WITH VINYLITE TUBING OF



S2A
CHANNEL SWITCH
RIGHT SIDE WHEN VIEWED
FROM REAR



FRONT AND REAR OF S1 "A" AND "B"
VIEWED FROM REAR END OF SWITCH

28072B

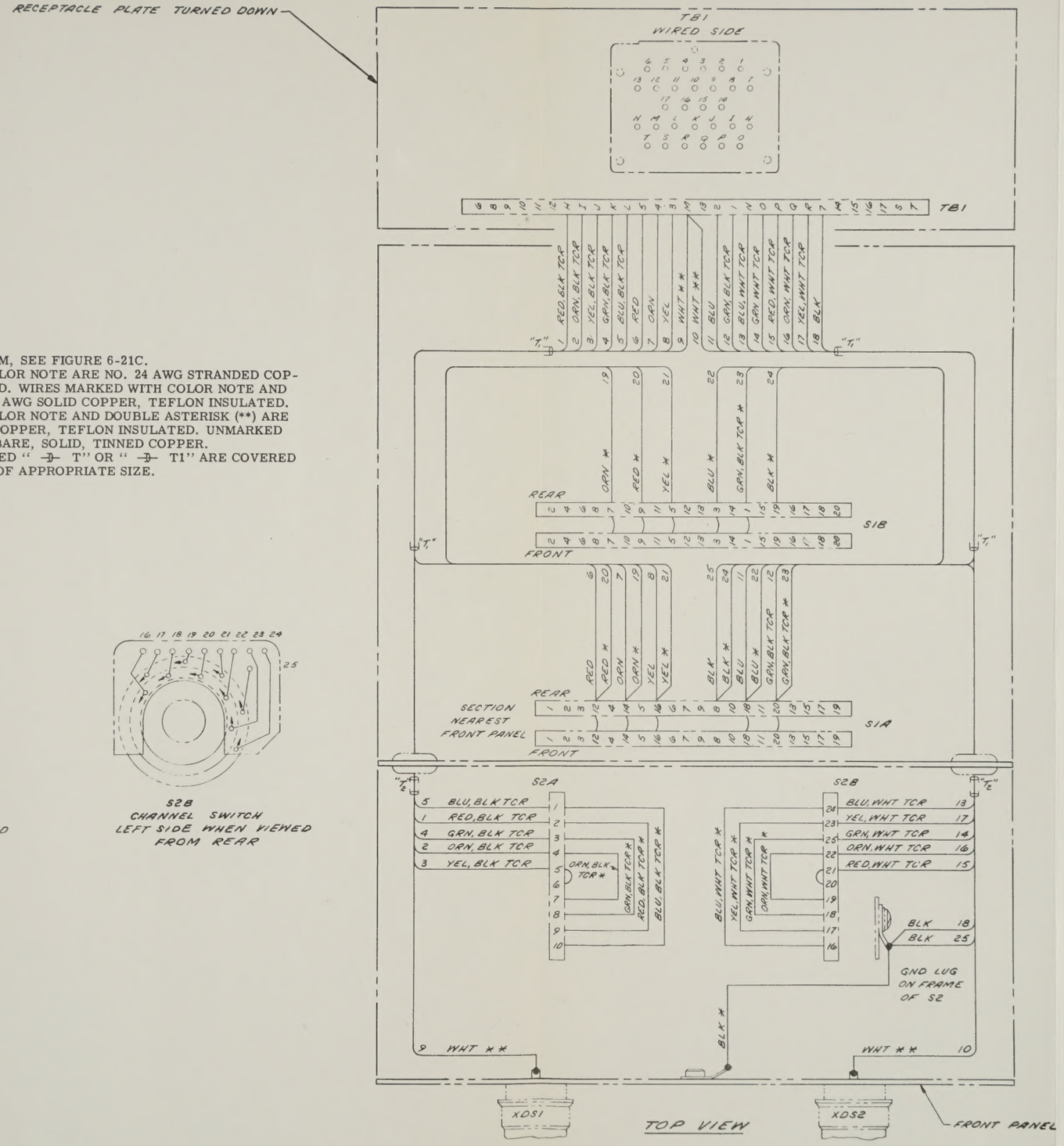
Figure 6-21D. ARC Type CC-10D Control Unit, Wiring Diagram

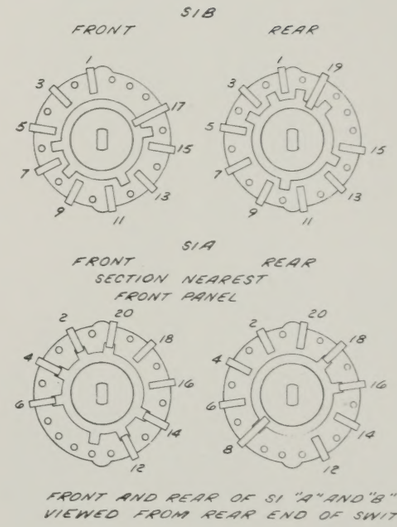
NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 6-21C.
2. WIRES MARKED WITH COLOR NOTE ARE NO. 24 AWG STRANDED COPPER, TEFLON INSULATED. WIRES MARKED WITH COLOR NOTE AND ASTERISK (*) ARE NO. 24 AWG SOLID COPPER, TEFLON INSULATED. WIRES MARKED WITH COLOR NOTE AND DOUBLE ASTERISK (**) ARE NO. 22 AWG STRANDED COPPER, TEFLON INSULATED. UNMARKED WIRES ARE NO. 24 AWG BARE, SOLID, TINNED COPPER.
3. GROUPS OF WIRES MARKED " -D- T" OR " -D- T1" ARE COVERED WITH VINYLITE TUBING OF APPROPRIATE SIZE.

S2A
CHANNEL SWITCH
RIGHT SIDE WHEN VIEWED
FROM REAR

S2B
CHANNEL SWITCH
LEFT SIDE WHEN VIEWED
FROM REAR





FRONT AND REAR OF S1 "A" AND "B" VIEWED FROM REAR END OF SWITCH

28072B

Figure 6-21D. ARC Type CC-10D Control Unit, Wiring Diagram

CESSNA AIRCRAFT COMPANY

WICHITA, KANSAS